Lower Passaic River Study Area

DIRECT DISCHARGE PRP CASES FOR THE LOWER PASSAIC RIVER STUDY AREA

PRP DATA EXTRACTION FORM AND EVIDENCE CONCERNING:

Spencer Kellogg

PREPARED FOR:

LOWER PASSAIC RIVER STUDY AREA
COOPERATING PARTIES GROUP

SUBMITTED TO:
USEPA REGION II

May 3, 2006

SPENCER KELLOGG

PRP DATA EXTRACTION FORM

INDEX OF EVIDENCE

Tab No.	Year	Day and Month	Description
1	1979	11-Apr	Spencer Kellogg TEXTRON Correspondence
2	1980	28-Jan	Spencer Kellogg TEXTRON Correspondence and
3	1982	7-Dec	Spencer Kellogg TEXTRON Correspondence

Tab No.	Year	Day and Month	Description
4	1985	21-Jun	TEXTRON Correspondence
5	1987	March	ECRA Sampling Plan Results
6	1990	January	ECRA Cleanup Plan
7	1997	14-Feb	TEXTRON'S Response to Request for Information
8	1985	23-Aug	ECRA Site Evaluation Submission
9	1985	23-Aug	ECRA Case Appendix 5 - Description of Spill or
10	1982	25-Jun	Spencer Kellogg TEXTRON Correspondence
11	1982	21-Apr	Spencer Kellogg TEXTRON Correspondence
12	1991	16-Dec	ECRA Case Progress Report
13	1978	18-Dec	Deed
14	1987	March	Presentation of the ECRA Sampling Plan Results
15	1988	June	Presentation of the Phase II ECRA Sampling Plan
16	1990	October	Presentation of Additional ECRA Sampling Results and
17	2006	11-Apr	*Hoover's Inc. Company Records Report - Textron, Inc.*
18	2006	20-Apr	Textron, Inc. Web Site Information

5/3/06

LOWER PASSAIC RIVER STUDY AREA
PRP DATA EXTRACTION FORM

SPENCER KELLOGG DIVISION OF TEXTRON, INC.

CURRENT MAILING ADDRESS/CONTACT INFO:

Patricia Bisshopp, Esq.
Textron, Inc.
40 Westminster Street
Providence, Rhode Island 02903

FACILITY ADDRESS:

400 Doremus Avenue
Newark, New Jersey
(the "Site")

(FMT000001 at Tab 1)

FINANCIAL VIABILITY (annual revenue, # of employees):

Textron, Inc. is a publicly traded company, founded in 1923 and engaged in the manufacture of industrial goods, helicopters, weapons systems, airplanes and aerospace and automotive fasteners and tools. (FMT001349-1350 at Tab 17, FMT001351-1352 at Tab 18)

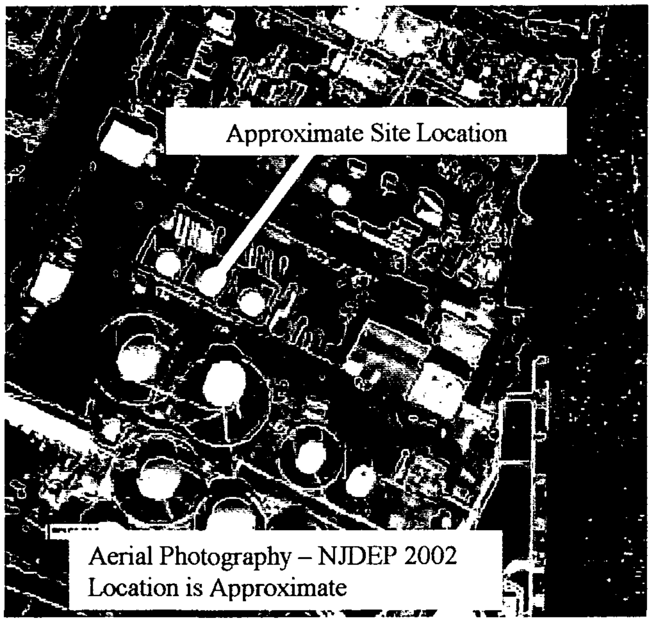
Financial sources indicate that as of 2005, Textron, Inc. operated with 37,000 employees and had annual sales of $10,043,000,000. (FMT001351-1352 at Tab 17)

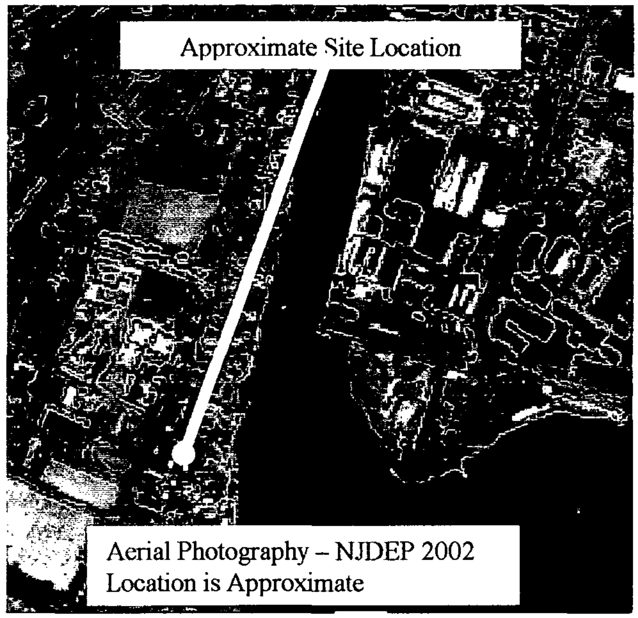
DATES OF OPERATION (include info. on predecessors/successors if known):

Operations at the Site were conducted by the Spencer Kellogg Division of Textron as of December 11, 1978, the date on which operations at the Site were sold by Ashland Chemical to Textron, Inc. (FMT000378 at Tab 13) The assets of Textron's Spencer Kellogg Division, including the operating facility at 400 Doremus Avenue, were sold to NL Industries, Inc. on June 17, 1985. (FMT000014 at Tab 4) It is unknown whether NL Industries assumed environmental liabilities for Spenser Kellogg's past operations upon the purchase of certain assets of Spencer Kellogg.

DESCRIPTION OF FACILITY OPERATIONS (list CERCLA hazardous substances used, manufactured or present):

As shown below, the 10-acre Site is located at 400 Doremus Avenue in Newark, New Jersey. (FMT000054 at Tab 6) Resins and related products have reportedly been manufactured at the Site since the 1930s. (FMT000055 at Tab 6) Spencer Kellogg reported to the Passaic Valley Sewerage Commissioners ("PVSC") that their operations in 1980 consisted of "Manufacturing & Processing of Alkyd & Polyester Resins". (FMT000003 at Tab 2)





The following substances were received, used, manufactured, discharged, release, stored and/or disposed of by Spencer Kellogg at the Site.

- Acids
- Adipic acid
- Ammonium hydroxide
- Aromatic solvent 100
- Aromatic solvent 150
- Aliphatic solvent 140
- Benzoic acid
- Butanol
- Butyl acetate
- Dicyclo pentadiene
- Ethylbenzene
- Ethanol
- Formaldehyde
- Isoactylalcohol
- Isoparaffinic petroleum solvent
- Maleic and Trimellitic anhydride
- Methyl methacrylate
- Methyl propyl ketone
- MEK
- Mineral spirits
- Neopentyl glycol
- Phthalic anhydride
- Phospheric acid (85%)
- Sodium hydroxide
- Styrene
- Sulfuric acid
- Toluene
- Triethyl amine
- VM&P Naptha
- Xylene

- Vinyl toluene
- #6 fuel oil

(FMT000117 at Tab 7, FMT000168 at Tab 8, FMT000203 at Tab 11)

Spencer Kellogg requested a withdrawal of their Hazardous Waste Permit application in 1982, citing the ability to remove and dispose of wastes within the 90-day time limit, effective December 31, 1982. (FMT000010 at Tab 3) A 1984 letter from NJDEP to Spencer Kellogg indicates that their January 1984 request to have their tank storage activity delisted as a hazardous waste unit was denied on the basis that the tank would still be used to hold hazardous waste prior to offsite disposal. (FMT000132 at Tab 7)

Process wastes, consisting of filter cake and press paper, as well as strainer bags, ~~are~~ were drummed as hazardous waste. The drums are held on-site and shipped to a TSD facility approximately every month. Bag drainings from the truck loading process are recycled or collected and disposed of as bulk liquid hazardous waste. (FMT000162-163 at Tab 8)

In 1991, Textron undertook a New Jersey ECRA cleanup at the Site. In accordance with a May, 1991 Work Plan, resinous materials were excavated from several Areas of Environmental Concern (AECs) and sent offsite for disposal as New Jersey hazardous waste (C433). (FMT000265-FMT000275 at Tab 12)

Site Soil Contamination:

A March, 1987 ECRA Sampling report documents soil and groundwater sampling in 27 different AECs, chosen on the basis of visible evidence of spills or the potential for discharges of raw materials, fuel oil or finished product. (FMT000491-493 at Tab 14)

The primary constituents detected in soils were Total Petroleum Hydrocarbons ("TPHs") and Volatile Organic Compounds ("VOCs") such as ethylbenzene, toluene and xylenes. However, during sampling performed between November 1986 and March 1987, Site surface soils (0-2' in depth) were found to be contaminated with the following.

- Petroleum hydrocarbons up to 280,000,000 ppb
- Ethylbenzene up to 11,000,000 ppb
- Toluene up to 3,399,398 ppb
- Benzene up to 28 ppb
- Methylene chloride up to 120 ppb
- Arsenic up to 22,200 ppb
- Cadmium up to 1,630 ppb
- Chromium up to 126,000 ppb
- Copper up to 388,000 ppb
- Lead up to 585,000 ppb
- Mercury up to 1,015 ppb
- Nickel up to 24,600 ppb

- Silver up to 5,320 ppb
- Zinc up to 736,000 ppb

The results from the same sampling event in 1986-1987 show soils at depths below 2' to be contaminated with the same constituents.

(FMT000704-5 at Tab 14, FMT000707 at Tab 14, FMT000710 at Tab 14, FMT000712 at Tab 14, FMT000714 at Tab 14, FMT000719 at Tab 14, FMT000721-2 at Tab 14, FMT000734 at Tab 14, FMT000734 at Tab 14, FMT000736 at Tab 14, FMT000737 at Tab 14)

An October 1990 report by ENVIRON stated that VOCs in Site soils were likely the result of on-site industrial operations. (FMT000993 at Tab 16)

In 1990, NJDEP required Textron and ENVIRON to perform additional sampling to further define base neutral (BN) contamination, both in areas already sampled and in areas not previously targeted for cleanup, as well as VOC contamination in areas already planned for remediation. (FMT000994 at Tab 16) The resulting cleanup plan called for remediation of 13 AECs and one area outside the previously-defined AECs in order to bring contaminant levels below 10 ppm for carcinogenic PAHs and total VOCs, 1 ppm for benzene and 100 ppm for total base neutrals. (FMT0001029 at Tab 16, FMT0001234 at Tab 17)

Site Groundwater Contamination:

The results from the 1986-1987 sampling event show the following contaminants in Site groundwater:

- Petroleum hydrocarbons up to 70,000 ppb
- Chloride up to 5,150,00 ppb
- Ethylbenzene up to 210 ppb
- Toluene up to 34,000 ppb
- Benzene up to 15 ppb
- Arsenic up to 16 ppb
- Cadmium up to 26 ppb
- Chromium up to 25 ppb
- Copper up to 167 ppb
- Iron up to 480,000 ppb
- Lead up to 521 ppb
- Mercury up to 1.2 ppb
- Nickel up to 49 ppb
- Zinc up to 188 ppb

(FMT000708 at Tab 14, FMT000719 at Tab 14, FMT000730 at Tab 14, FMT000732 at Tab 14, FMT000733 at Tab 14, FMT000735 at Tab 14, FMT000737 at Tab 14)

The 1990 report which described VOC contamination of soil also states that the same constituents were found in shallow groundwater at the Site. (FMT000993 at Tab 16)

PERMITS (provide dates):

NPDES:

Information is not available at this time.

POTW (pretreatment):

In its PVSC Sewer Connection Application from 1980, Spencer Kellogg reports that pretreatment processes include decanting of Building 31 water to remove separable oils and solvents. (FMT000005 at Tab 2) The facility held a PVSC permit from May 1981 to May 1986. (FMT000116 at Tab 7)

NEXUS TO LOWER PASSAIC RIVER STUDY AREA (describe in detail; cite to supporting documentation; date or time period of disposal; list CERCLA hazardous substances; and volume, if known):

Direct (e.g. pipe, outfall, spill):

On September 10, 1979, a tank in the yard overflowed, spilling an unknown quantity of resin into the drain. Some of the resin entered the underground flume in the shallow aquifer and was discharged into Newark Bay (but within the Lower Passaic River Study Area). (FMT000171-172 at Tab 9) Although there is no documentation available regarding the chemical makeup of the spilled product, the following hazardous substances were used by Spencer Kellogg in the production of its resin:

- Acids
- Adipic acid
- Ammonium hydroxide
- Aromatic solvent 100
- Aromatic solvent 150
- Aliphatic solvent 140
- Benzoic acid
- Butanol
- Butyl acetate
- Dicyclo pentadiene
- Ethylbenzene
- Ethanol
- Formaldehyde
- Isoactylalcohol
- Isoparaffinic petroleum solvent
- Maleic and Trimellitic anhydride
- Methyl methacrylate
- Methyl propyl ketone
- MEK
- Mineral spirits
- Neopentyl glycol

- Phthalic anhydride
- Phospheric acid (85%)
- Sodium hydroxide
- Styrene
- Sulfuric acid
- Toluene
- Triethyl amine
- VM&P Naptha
- Xylene
- Vinyl toluene

(FMT000117 at Tab 7, FMT000168 at Tab 8, FMT000203 at Tab 11)

Sanitary Sewer (provide name and location of CSO; details regarding CSO overflows and dates:

Information is not available at this time.

Storm Sewer (provide name and location of CSO; details regarding CSO overflows and dates):

Information is not available at this time.

Runoff:

Information is not available at this time.

Groundwater:

Information is not available at this time.

POTENTIAL NEXUS TO LOWER PASSAIC RIVER STUDY AREA (describe in detail; cite to supporting documentation; list CERCLA hazardous substances; and volume, if known):

Direct (e.g. pipe, outfall, spill):

No information available at this time.

Sanitary Sewer (provide name and location of CSO; details regarding CSO overflows and dates):

No information available at this time.

Storm Sewer (provide name and location of CSO; details regarding CSO overflows and dates):

Information is not available at this time.

Runoff:

A 1987 report by ENVIRON Corporation indicates that in several AECs, there is evidence of surface spills of resin (finished product), waste materials, phthalic anhydride and fuel oil. (FMT000491-493 at Tab 14) Surface soil sampling results presented in the 1987 report also indicate the presence of high levels of VOCs in several AECs. (FMT000704-728 at Tab 14)

All storm water from storm sewers and catch basins was discharged directly to the Passaic River during Textron's ownership of the facility. (FMT000123 at Tab 7) Prior to 1982, storm drains in outside areas of the facility where hazardous materials were handled had no covers to prevent spilled materials from entering storm drains. (FMT000191 at Tab 10)

Groundwater:

A 1998 ECRA report states that:

> Textron does recognize, however, that some of the soil contamination, particularly the VOCs, can be linked to historical on-site industrial activities. In addition, the ground water data show that the VOCs are leaching into the shallow ground water in a limited portion of the site.

(FMT000873 at Tab 15)

Ethylbenzene was detected in water samples from the underground flume, which discharges from the shallow aquifer directly to Newark Bay. (FMT000483 at Tab 14, FMT000036 at Tab 5) The direction of shallow groundwater flow at the Site is toward the underground flume, which acts as a lined sink for groundwater. (FMT000036 at Tab 5, FMT000523 at Tab 14, FMT000795 at Tab 15)

Groundwater sampling performed in 1985 indicates low levels of VOC contamination in three wells (MW6, MW7 and MW11) and more significant levels of contamination in a fourth well (MW10), hypothesized to be the result of localized soil contamination. (FMT000483 at Tab 14) Both the water samples taken from MW6 and the soil samples from the surrounding area contained VOCs, particularly toluene. (FMT000562 at Tab 14) VOCs were also detected in MW7 and the associated soil samples; concentrations of VOCs in soil were low, but significantly exceeded cleanup values in the water sample. (FMT000564 at Tab 14) AEC6, which includes MW11, was sampled relative to soil and groundwater. MW11 showed concentrations of VOCs in excess of cleanup guidelines; however, soils in this area were not analyzed for VOCs. (FMT000544 at Tab 14) In AEC17, which includes MW10, toluene and ethylbenzene were detected in both soil and groundwater. This AEC is comprised of a drum storage area that was unpaved. (FMT000552-553 at Tab 14)

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Street
Newark, NJ 07105
201 / 589-3709

300-921

April 11, 1979

Mr. C. Della Pia
Passaic Valley Sewerage Commissioners
600 Wilson Avenue
Newark, New Jersey

Dear Mr. Della Pia:

Spencer Kellogg Division of Textron, Inc. now owns the property at 400 Doremus Avenue, Newark, N.J. formerly owned by Ashland Chemical Co. The processes have not changed and the same products are being made by the new owners.

Sincerely,

R. D. Barr

R. D. Barr
Plant Engineer

:ir

RECEIVED
APR 16 1979

945990012

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201 / 589-3709

January 28, 1980

Passaic Valley Sewerage Commissioner
600 Wilson Avenue
Newark, New Jersey 07105

Gentlemen:

Attached is a copy of completed Sewer Connection Application requested by your office. Please note that effluent was sampled and analyses run by Aqua Associates Inc, West Caldwell, New Jersey. We have not included heavy metals analysis on this report as agreed in your letter to me dated December 3, 1979 in which the analytical data of Killan Associates was deemed to be acceptable.

There is one very unusual point in these analyses that I feel should be commented upon and that is our pH measurement. This measurement was rechecked on the collected sample at my request and found to be correct. However our previous sampling of our effluent stream indicates that a pH of approximately 8 to 9 would be expected. Accordingly we took a grab sample on January 25, 1980 and pH was found to be 4.6. Please advise if further analysis is necessary to clarify the question of effluent pH.

Very truly yours,

AEDieffenbach

A. E. Dieffenbach
Senior Process Engineer

:ir

att.

Copy to: J. F. Brooks
R. C. Hussong
J. O'Donnell
J. Goodrum
M. Smith

PASSAIC VALLEY SEWERAGE COMMISSIONERS

SEWER CONNECTION APPLICATION

PART I - SECTIONS A-C

SECTION A: GENERAL INFORMATION

Y or N

Applicant is:
Corporation X
Partnership ____
Other ____

1. Company Name: SPENCER KELLOGG DIV OF TEXTRON INC

2. Location: 400 DOREMUS AVE
NEWARK N.J Zip Code: 07105

3. Mailing Address: ____
Zip Code: ____

Name, title, address and telephone number of person to contact concerning information provided in this application:

4. Name of Contact Official: ARTHUR E. DIEFFENBACH
Title: SENIOR PROCESS ENGINEER Phone No.: 589-3709

5. Address: 400 DOREMUS AVE NEWARK N.J

6. Number of Employees - Full Time: 100 Part Time: —

7. Number of Work Days Per Week: 5
Number of Shifts Per Day: 3
Is production seasonal? NO If so, explain: ____

8. New Users Only: Indicate date user desires to commence operations:
____

9. If property is owned, indicate Lot and Block Numbers: 5070-9, 9A, 11, 11A
1977 Assessed Value: $1,228,900

10. If property is rented, indicate name and address of Landlord:
____

SECTION B: PRODUCT OR SERVICE INFORMATION

11. Brief description of manufacturing or other activity performed:
MANUFACTURING & PROCESSING OF ALKYD & POLYESTER RESINS

12. Principal raw materials used: ORGANIC POLYBASIC ACIDS, POLYALCOHOLS, SOLVENTS & VEGETABLE OILS

13. Principal products or services:
PLASTIC RESINS

SECTION C: WATER DATA

14. Water Received: Year 1978 (Report Volume in Gallons)

	PURCHASED	WELL	RIVER	TOTAL
1st Qtr.	17,623,628	-	-	17,623,628
2nd Qtr.	12,285,152	-	-	12,285,152
3rd Qtr.	13,538,052	-	-	13,538,052
4th Qtr.	11,050,204	-	-	11,050,204

19 GRAND TOTAL 54,497,036

NOTE: Cu. Ft. X 7.48 = Gallons

15. Name water supplier: CITY OF NEWARK Account#: 10788732000

16. Is well water metered? N/A Is river water metered? N/A

17. Water Distribution: Year 1978 (Report Volume in Gallons)

Use (List totals in gallons per year)

(a) sanitary sewer (include industrial & domestic) 48502363

(b) separate storm sewer, river, or ditch. . . . . 1089940 ⊗

(c) contained in product 1634911

(d) evaporation. 3269822

(e) waste haulers. . . . . —

Name, Address & Registration Number of Waste Haulers Used ______

18. Is volume in 17 (a) measured? No How? ______

⊗ see letter dated 5/8/81 from Mr. Dieffenbach

Certification:

The information contained in Part I of this application is familiar to me and, to the best of my knowledge and belief, such information is true, complete and accurate.

If the applicant is a corporation, a corporate resolution is attached granting me the authority to sign the application on behalf of the corporation.

Name of Signing Official: John F Brooks

Title: Plant Manager

1-28-80 — Date

John F Brooks — Signature

945990016

These sections must be completed if the Applicant:

(a) discharges more than 25.000 gallons per day of either domestic and/or industrial wastes to the sanitary or combined sewer, or,

(b) discharges toxic wastes or wastes which can have a significant impact on the PVSC treatment works.

Questions regarding the applicability of this form to your facility may be answered by contacting the Industrial Department of PVSC at 344-1800.

Company Name: SPENCER KELLOGG DIV OF TEXTRON INC

Location: 400 DOREMUS AVE NEWARK NJ 07105

SECTION D: OPERATIONAL CHARACTERISTICS

19. Discharge of industrial waste is continuous ✓ or intermittent ______

20. Discharge of industrial waste occurs between the following hours: ______

______

21. Industrial Waste is, or may be discharged:

(a) only to the sanitary (or combined) sewer ✓

(b) to both the sanitary (or combined) sewer and a separate storm sewer, river or ditch ______

(c) NPDES Permit Number ______

22. Describe seasonal variations, if any, giving dates, volumes, rates, hours, etc. Include variations in product lines which affect waste characteristics.

NONE

23. Describe any pretreatment process in use:

BLDG 31 WATER IS DECANTED to REMOVE SEPARABLE OILS AND SOLVENTS

24. Describe any treatment process applied to raw water taken into the plant:

NONE

25. Describe any processes used to recycle water: PROCESS COOLING IS OBTAINED FROM WATER COOLING TOWER, WHICH IS RECIRCULATED.

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

SECTION E: SEWER CONNECTION INFORMATION

26.

OUTLET * NUMBER	SEWER SIZE (INCHES)	DAILY FLOW (GALLONS)	CONTAINS INDUSTRIAL WASTE (YES OR NO)
	8	~~267,000~~	YES
		186,547 gpd	
		see letter of correction	
		of May 8, 1981	

(2) [illegible]

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

from Mr. Dieffenbach

Attach a plot plan of the property, showing:

(a) all existing or proposed sewer and drain lines (including outlets to a storm sewer, river or ditch);

(b) sample point(s);

(c) details of the connection(s) to the municipal (or PVSC) sewer, including the distance and direction of each connection from the nearest street intersection.

*If only one outlet, leave blank.

Number multiple outlets starting with 1.

945990018

27. Analysis listed below is based on a composite sample of industrial waste taken from the following outlets listed in Section E:

SINGLE OUTLET

(See instructions for proportioning samples from more than one outlet)

28. Analytical Data: Concentration values are to be reported in mg/l (ppm) unless specified otherwise; analyze waste for those parameters marked with an asterisk (*), analyze waste for other parameters reasonably expected to be present. Code numbers are for internal use only.

REPORT TO THE NEAREST UNIT: X (EXAMPLE: 150 mg/l)

CODE	PARAMETER	VALUE
* 0100	Color (Apha Units)	10
0200	Radioactivity (PL-1)	
* 0500	Total Solids	196 MG/L
* 0505	Total Volatile Solids	186 MG/L
* 0510	Total Mineral Solids	10 MG/L
* 0530	Total Suspended Solids	12 MG/L
* 0540	Volatile Suspended Solids	10.5 MG/L
* 0550	Mineral Suspended Solids	1.5 MG/L
* 0070	Turbidity (JTU)	2.5 NTU
0550	Emulsified Oil or Grease	7.8 MG/L
* 0940	Chlorides	21.0 MG/L
* 0945	Sulfates	20.0 MG/L
* 0310	Biochemical Oxygen Demand (BOD)	705 MG/L
* 0340	Chemical Oxygen Demand (COD)	976 MG/L
* 0680	Total Organic Carbon (TOC)	410 MG/L

REPORT TO THE NEAREST TENTH: 0.X (EXAMPLE 1.6 mg/l)

CODE	PARAMETER	VALUE
0745	Sulfide	
0740	Sulfité	
8260	Surfactants (MBAS)	
* 9000	pH (standard units) (range)	2.9
0625	Kjeldahl N as N	
0610	Ammonia as N	
0620	Nitrate as N	
0615	Nitrite as N	
0507	Ortho Phosphates as P	

REPORT TO THE NEAREST HUNDREDTH: 0.XX (EXCEPT WHERE INDICATED) (EXAMPLE: 0.36 mg/l)		
CODE	PARAMETER	VALUE
1097	Antimony (Sb)	
1002	Arsenic (As)	
1022	Boron (B)	
1027	Cadmium (Cd)	
1034	Chromium Total (Cr)	
1042	Copper (Cu)	
1045	Iron (Fe)	
1051	Lead (Pb)	

REPORT TO THE NEAREST HUNDREDTH: 0.XX (EXCEPT WHERE INDICATED) (EXAMPLE: 0.36 mg/l)		
CODE	PARAMETER	VALUE
1900	Mercury (Report to 0.XXX)	
1067	Nickel (Ni)	
1147	Selenium (Se)	
1077	Siver (Ag)	
1102	Tin (Sn)	
1092	Zinc (Zn)	
4053	Pesticides (Report to 0.XXX)	
2730	Phenol	

29. Samples collected by: AQUA ASSOCIATES INC Date: 1/14/80

30. Samples analyzed by: AQUA ASSOCIATES INC Date: 1/14/80

Products being manufactured when sample was collected: PLASTIC RESINS

Certification:

The information contained in Part II of this application is familiar to me and, to the best of my knowledge and belief, such information is true, complete, and accurate.

If the applicant is a corporation, a corporate resolution is attached granting me the authority to sign the application on behalf of the corporation.

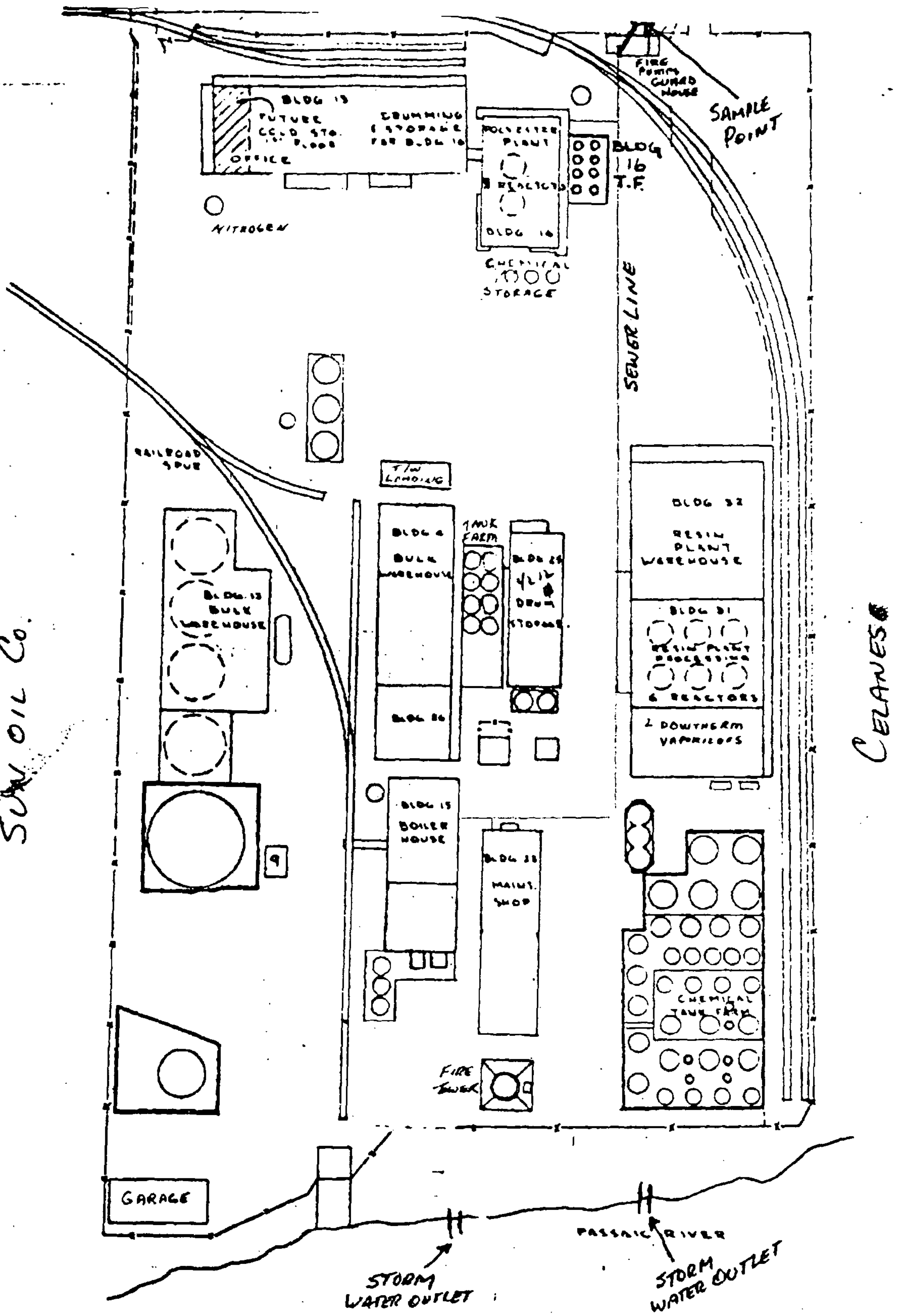
31. Name of Signing Official: JOHN F. BROOKS

Title: PLANT MANAGER

1-28-80
Date

[signature]
Signature

945990020



SPENCER KELLOGG TEXTRON
DIV. OF TEXTRON INC.
NEWARK, NEW JERSEY
390-400 DOREMUS AVE.
NEWARK N.J

945990021

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

December 7, 1982

Regional Administrator
U. S. EPA Region II
Room 900
26 Federal Plaza
New York, New York 10278

Dear Sir/Madam:

SUBJECT: Withdrawal of Hazardous Waste Storage Permit Application
Reference: NJD 092217892

By this letter we are requesting withdrawal of our permit application for storage of hazardous waste at this location. Our notification and application were made as a precautionary measure. We have found that we are able to accomplish removal and proper off-site disposal of our wastes within the 90 day period allowed. Therefore, effective December 31, 1982, we will no longer require a permit as a storage facility.

We will, however, continue to operate as a generator of hazardous waste under our EPA identification number NJD 092217892.

Please make the necessary corrections in your records and let us know if there is any other action necessary on our part.

Sincerely yours,

John F. Brooks,
Plant Manager

:mf
cc: M. J. Soderberg
C. J. O'Donnell
M. D. Smith
John Canty - Textron

945990023

TEXTRON

Textron Inc.

40 Westminster Street
Providence, R.I. 02903
401/421-2800

June 21, 1985

RECEIVED
JUN 24 9 09 AM '85
DIVISION OF
WASTE MANAGEMENT
HSMA-BISE

Fed Ex.

N.J. Department of Environmental Protection
Division of Waste Management
Bureau of Industrial Site Evaluation CN 028
Trenton, NJ 08625

Attention: ECRA Initial Notice

Gentlemen:

On June 17, 1985, Textron Inc. ("Textron") entered into a Purchase and Sale Agreement with NL Industries, Inc. ("NL"), relating to the sale by Textron to NL of the assets and business of Textron's Spencer Kellogg Division ("Spencer Kellogg"). Said assets include Spencer Kellogg's six operating facilities, one of which is located in New Jersey (the "Newark Resin Plant").

Therefore, enclosed for filing in accordance with the regulations of the Environmental Cleanup Responsibility Act is Textron's Initial Notice General Information Submission, relating to the Newark Resin Plant. Also enclosed is a copy of the Purchase and Sale Agreement referred to above.

Should you have any questions regarding this Initial Notice or the proposed transaction, please contact the undersigned.

Please acknowledge receipt of the enclosed documents by so noting on the enclosed copy of this letter and returning the copy in the enclosed self-addressed, stamped envelope.

Very truly yours,

Frederick K. Butler

Frederick K. Butler
Group Counsel
& Assistant Secretary

FKB:ens
Enclosures

Presentation of the
ECRA Sampling Plan Results
for
SPENCER KELLOGG
FORMERLY A DIVISION OF TEXTRON
400 Doremus Avenue
Newark, Essex County
New Jersey
Volume I of IV

ECRA Case No. 85403

March, 1987

Prepared for

Textron Inc.
Providence, Rhode Island 02903

Prepared by

ENVIRON Corporation
210 Carnegie Center, Suite 201
Princeton, New Jersey 08540

945990027

EXECUTIVE SUMMARY

To assist Textron Inc. in complying with the Environmental Cleanup Responsibility Act (ECRA), ENVIRON implemented the New Jersey Department of Environmental Protection (NJDEP) approved Revised Sampling Plan for the Spencer Kellogg facility in Newark, New Jersey. The work was performed from November, 1986 through March, 1987.

For the past several decades, the plant has manufactured coating resins which are used primarily in the paint industry. Based on a series of site visits, a review of past and present site operations, and a review of historical aerial photographs, twenty seven areas of environmental concern (AECs) were identified. To evaluate the effect of past activities at this site on the quality of the soil and the ground water, and as to determine the geologic and hydrogeologic characteristics of the site, forty six soil borings, eleven shallow monitoring wells and three deep monitoring wells were installed. Soil, surface water, and ground water samples were collected and analyzed for the chemicals potentially present due to activities within the AECs.

Four geologic units were encountered at the site. The uppermost unit is comprised of fill material and extends from the ground surface to an average depth of 8 feet. Beneath this lies a clay, silt and peat unit with an average thickness of 19 feet. A well sorted sand and gravel unit, which varies in thickness from 13 to 14 feet, underlies the clay, silt and peat. Beneath the sand and gravel is a reddish-brown clay and silt unit of unknown thickness.

Two aquifers were encountered at the site. The shallow aquifer lies within the fill unit. The shallow and deep aquifers are separated by the thick clay, silt and peat unit which acts as a semi-confining layer. The deep aquifer was encountered at an average depth of 27 feet below ground surface. The direction of ground water flow in the shallow aquifer is primarily toward an underground flume which travels beneath the site and discharges into Newark Bay. The direction of ground water flow in the deep aquifer is toward Newark Bay.

The analytical data suggest that ethylbenzene, toluene, and petroleum hydrocarbons in concentrations above the ~~informal~~ BISE cleanup guidelines have been introduced into the soil of the fill unit by operations and activities at the facility. Because of problems inherent with the analysis for total petroleum hydrocarbons, it is not possible to distinguish between petroleum hydrocarbons and the non-hazardous fish and vegetable oils which have been used in large quantities at this facility. Therefore, some of what is reported as petroleum hydrocarbons may be the non-hazardous fish and vegetable oils. In addition, the presence of petroleum hydrocarbons in widely varying concentrations in soil samples collected from areas in which no operations are known to have occurred suggests that the presence of some of the petroleum hydrocarbons detected at the site may be related to the fill material rather than to operations at the facility.

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Despite the presence of significant concentrations of ethylbenzene, toluene and petroleum hydrocarbons in certain areas of the fill unit, very little contamination was detected in the shallow aquifer. The pavement which covers the site appears to prevent the infiltration of rain water from the surface and thus inhibits the migration of contaminants from the soil matrix into the ground water. Petroleum hydrocarbons were detected in only one shallow well, the upgradient well MW2, and apparently originate from an off-site source. Relatively low concentrations of volatile organics were detected in three of the eleven shallow wells. In a fourth shallow well, more significant concentrations of volatile organics were detected, but this contamination appears to be related to localized soil contamination. The apparently low partitioning of contaminants from the soil to the ground water, as evidenced by the relatively low concentrations of contaminants in ground water, suggest that minimal contaminant transport from the site is occurring.

MW7
MW11
MW10

The results of analyses performed on water samples collected from the underground flume support this hypothesis as well. Only one contaminant, ethylbenzene, appears to be introduced into the flume as it travels beneath the site, and this contaminant may be entering the flume through storm drains that discharge to the flume, rather than from the infiltration of ground water.

In the deep aquifer, no contamination was found in either of the upgradient wells, but volatile organic contamination was detected in the downgradient well, MW22. The data suggest that the contamination detected may be due to a defect in the well, which may allow the infiltration of water from the flume to occur during purging of the well, rather than to actual contamination within the deep aquifer. Further investigation is necessary to evaluate this explanation.

In the Phase Two Sampling Plan, which will be submitted to NJDEP at a later date, sampling will be proposed to further delineate the areal extent of contamination in certain portions of the site, to refine the current understanding of the ground water flow patterns at this site, and to clarify other issues which were not resolved in this first phase of sampling. The second phase of sampling is likely to include the collection of additional measurements from existing wells and from the underground flume as well as the installation of additional soil borings. Additional monitoring wells may also be added. Finally, Textron may begin evaluating cleanup levels that might be appropriate should in a Cleanup Plan be necessary for this site. Thus, the Phase Two Sampling Plan may include an evaluation, based on available toxicity data, of the health and environmental risks associated with exposure to various levels of the contaminants found at this site.

COPY

CLEANUP PLAN
FOR SPENCER KELLOGG FACILITY
FORMERLY A DIVISION OF TEXTRON INC.
400 DOREMUS AVENUE
NEWARK, ESSEX COUNTY, NEW JERSEY

ECRA Case No. 85403

Prepared for

Textron Inc.
Providence, Rhode Island 02903

Prepared by

ENVIRON Corporation
Princeton, New Jersey 08540

January 1990

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

LIST OF APPENDICES

LIST OF TABLES

CONTENTS

(continued)

LIST OF FIGURES

LIST OF PLATES

288E:0954b

I. INTRODUCTION

A. Purpose and Scope

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA) which allowed Textron to sell its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg facility or the site) to NL Industries, Inc. To assist Textron in complying with ECRA, ENVIRON received the New Jersey Department of Environmental Protection's (NJDEP) approval of a Phase I Sampling Plan and implemented that plan from November 1986 to March 1987. ENVIRON submitted the results to NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and presented the results to NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

Results of the Phase I Sampling Plan indicated the presence of soil and ground water contamination[1] at the Spencer Kellogg facility. ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987 to define more fully the nature and areal

---

1 For this report, "contamination" is defined as concentrations of a particular substance exceeding informal NJDEP-established ECRA action levels for soil or ground water (Appendix A). ENVIRON is using these action levels to simplify the presentation and interpretation of sampling results. Neither ENVIRON nor Textron suggests, however, that the informal ECRA action levels provide an appropriate basis for determining the need for and/or scope of site cleanup.

extent of both soil and ground water contamination in certain areas of the site, to characterize ground water flow patterns, and to clarify other issues that were not resolved during the first phase of sampling. ENVIRON provided the results to NJDEP in June 1988 in a report entitled "Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan."

In this report, ENVIRON provides a brief summary of the analytical results and proposed remediation strategies set forth in earlier reports, discusses the evaluation of feasible remedial alternatives and the results of feasibility testing for <u>in situ</u> bioremediation, and presents the proposed Cleanup Plan.

The Cleanup Plan consists of a conceptual design for cleanup of contaminated soils using <u>in situ</u> bioremediation and a discussion of additional tasks that must be completed prior to developing final remedial designs. Final designs will be developed after NJDEP approval of the proposed Cleanup Plan, completion of proposed additional laboratory and field studies, and agreement between NJDEP and Textron that <u>in situ</u> bioremediation will effectively treat VOCs and TPHCs. Specifically, the Cleanup Plan consists of the following components:

- Discussion of the overall cleanup objectives;
- Preferred cleanup actions for contaminated soils;
- Alternative site cleanup actions;
- Proposed additional laboratory and field testing;
- A preliminary schedule to implement the Cleanup Plan; and
- Preliminary estimated costs for the proposed cleanup actions.

As required by ECRA, a schedule and cost estimate have been developed for the proposed Cleanup Plan. The schedule provides a preliminary estimate of the timing for implementing cleanup and is based on the scope of activities planned for the next phase of work and the time required to develop final remedial designs and receive agency approval. A more detailed schedule for full-scale implementation of cleanup can be developed after completion of the proposed additional laboratory and field testing and will be presented to NJDEP as part of the final remedial design work plan. The estimated costs are based on discussions with vendors, unit costs from published literature on the proposed cleanup actions, and ENVIRON's experience. If necessary, the cost estimate will be modified as the remedial designs are finalized.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site, approximately 10 acres, is directly across from Kearny Point--which marks the confluence of the Passaic and Hackensack Rivers, which join to form Newark Bay. Originally marshland, the site was filled in by the early 1900s and has since been subject to industrial activity.

Plate 1 depicts the main features of the site. A breakwall consisting of concrete-covered rip rap is located along the eastern property edge adjacent to Newark Bay. West of the property is a landfill which drains into Plum Creek. Upon leaving the landfill, Plum Creek enters an underground conduit or flume, through which it flows under Doremus Avenue and beneath the site. This flume discharges from a pipe in the breakwall directly into Newark Bay.

According to plant personnel, the site has been used as a manufacturing facility since the first or second decade of this century. Before that time, the site housed an alcohol distillery. Resins and resin-related products have been manufactured on-site from the early 1930s to the present. For the past several decades, the facility has manufactured coating resins used primarily in the paint industry. The site has been almost entirely paved for the last few decades.

C. Summary of Previous Sampling Activities, Environmental Concerns and Recommended Actions

Based on a series of initial site visits and a review of past and present operations, 27 areas of environmental concern (AECs) were identified. The rationale for selection of each AEC is provided in Table 1, and the locations are illustrated on Plate 1. To evaluate the effect of past site activities on the quality of soil and ground water and to determine the geologic and hydrogeologic characteristics of the site, ENVIRON completed 46 soil borings and installed 11 shallow and 3 deep monitoring wells during execution of the Phase I Sampling Plan, primarily within the aforementioned AECs. Soil, surface water and ground water samples were collected and analyzed for those chemicals that may be present due to industrial activities within the AECs.

The Phase I Sampling Plan results indicated that the primary soil contaminants at the site are total petroleum hydrocarbons (TPHCs) and volatile organic compounds (VOCs), particularly ethylbenzene and toluene. Base/neutral organic compounds (BNs), priority pollutant metals

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

TABLE 1: Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of possible discharge onto unpaved region from dumpster and compactor which receive waste from Buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of possible discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of possible discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of potential contamination beneath building on stilts possibly caused by a discharge of raw materials and finished products from the polyester resin manufacturing process through a hole in the building's floor.

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

TABLE 1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale for Selection
10	Site of finished product and raw materials storage while area was unpaved.
11	Former aboveground storage tank located in unpaved area.
12	Building on stilts with potential for spills or discharges beneath.
13	Site of former aboveground storage tanks while area was unpaved.
14	Site of former aboveground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with evidence of spills.

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

TABLE 1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale for Selection
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former aboveground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix has been stored in drums.
23	Tank wagon loading area for Building 4 where 1285 Premix may be generated.
25	Tank wagon loading area for Building 26 where 1285 Premix may be generated.
26	Drains in large tank farm which may have discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, NJDEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, NJDEP site inspection).

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

(PPMs) and other VOCs, such as benzene, methylene chloride and chloroform, were detected in only a few soil samples.

The primary ground water contaminants detected at the site during Phase I sampling were ethylbenzene and toluene. PPMs were detected above informal ECRA action levels in two of the five wells tested for metals. TPHCs, benzene and cyanide were each detected in only one ground water sample. Trace levels of VOCs were observed in one deep monitoring well. No other constituents of concern were detected at concentrations above informal ECRA action levels in ground water or soil samples collected during the Phase I sampling program.

To close the data gaps from the Phase I Sampling Plan and to provide a more comprehensive data base required for determining the need for and possible nature and extent of soil and ground water remediation, ENVIRON collected 42 additional soil samples and installed 11 additional shallow and deep monitoring wells during execution of the Phase II Sampling Plan. The primary objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) identify the oils that contribute to the TPHC contamination in each AEC; and (3) define further the nature and pattern of metal contamination.

The results of the Phase II Sampling Plan indicated the presence of PPMs over broad areas of the site and confirmed that a significant quantity of TPHCs detected previously are non-hazardous fish and vegetable oils. The data also indicated that petroleum-based hydrocarbons, such as fuel oils, lubricating oils and gasoline, remain within most of the tested AECs.

Phase II ground water quality data were similar to those obtained during Phase I ground water sampling. VOCs were present in localized areas of the site but were not detected in Phase II wells installed in downgradient areas. In addition, only two dissolved PPMs were detected and TPHCs were present only in the two background wells. No significant levels of contaminants were detected in the deep aquifer.

The results of both sampling programs indicated that several classes of constituents are present in soil and ground water at concentrations exceeding informal ECRA action levels. The results were also adequate to define the lateral and vertical extent of this contamination and to develop remedial strategies. Detailed discussions of all sampling activities, analytical results and proposed remedial strategies have been provided previously to NJDEP and are contained within the reports referenced in Section I.A. Provided below is a brief summary of: (1) the findings in terms of the probable source(s) of contamination; (2) recommended remedial strategies set forth to NJDEP in ENVIRON's June 1988 report entitled "Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategies/Part I Cleanup Plan;" and (3) NJDEP's response, where appropriate, to the recommended actions as outlined in the agency's January 30, 1989 letter to Textron (Appendix B).

1. Soil Contamination Related to On-Site Industrial Activities

VOCs, particularly ethylbenzene and toluene, appear to have been introduced into the soils of the fill unit in certain areas of the site by historical industrial operations and activities at the facility. The occurrence and relative concentrations of these compounds are generally consistent with known and possible uses within certain AECs. The distribution and concentrations of total VOCs are provided on Plate 2.

Ethylbenzene and toluene are known to have been used at this facility. These two compounds were detected only in areas in which it was suspected that they might be found due to past practices at the site. Also, ethylbenzene and toluene have been detected in the shallow ground water in localized areas of the site, although the levels of these constituents typically have been within the parts per billion (ppb) range. These results suggest that the shallow ground water has been minimally affected by soils containing VOCs.

TPHCs are also present in the fill unit over broad areas of the site. Like VOCs, the past use and handling of raw materials, products and wastes appear to have contributed to the levels of TPHCs found in soil. Results of hydrocarbon "fingerprinting" analyses performed as part of the Phase II Sampling Plan indicated, however, that a significant portion of the TPHCs are non-hazardous fish and vegetable oils. The data also indicated that petroleum-based hydrocarbons in excess of the informal ECRA action level still remain within several on-site areas. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as paint thinner, fuel oils, lubricating oils, gasoline, kerosene, coal tar, and polycyclic aromatic hydrocarbons (PAHs). The non-petroleum-based fractions typically were identified as either soybean oil or linseed oil. The results of these analyses are provided on Plate 3. In many instances, the types of oil identified were similar to those used on site. In other cases, there was no correlation between known site activities and the observed contamination, suggesting that petroleum hydrocarbons may be present in fill used on-site.

Total BNs or PAHs were detected at concentrations exceeding the informal ECRA action levels only in a few soil samples. The concentration of each of the individual compounds was relatively low. The source of these constituents at some sampling locations may be related to the presence of TPHCs, although the occurrence of total BNs or PAHs in other areas, where no apparent source exists, suggests that they may also be associated with the fill material.

As discussed in the June 1988 report, a number of factors were considered in determining the need for remediating these constituents, including the nature and probable source(s) of contamination, impact to ground water, and surrounding ambient conditions. The results of this analysis suggested that the continued operation of the facility with the existing levels of constituents in soil does not threaten public health or the environment and, therefore, that extensive remediation of the site is not warranted. However, because VOCs have reached the site's ground water and because VOCs in the soil largely resulted from past site operations, Textron proposed to evaluate the use of in situ bioremediation to reduce the concentrations of VOCs in the unsaturated soil.

Despite the presence of TPHCs in soils, Textron did not recommended remediation of these compounds in the June 1988 report. This recommendation was largely based on the observations that TPHCs were not leaching from the fill material into the shallow ground water and that a significant portion of these compounds were non-hazardous fish and vegetables oils. Although concentrations of TPHCs in excess of the informal ECRA action level were detected in both background wells, their presence is related to off-site sources. These background wells are located in areas unaffected by past site activities and are immediately adjacent to upgradient industrial establishments known to use or handle petroleum products. As with TPHCs, Textron did not propose remediation of BNs or PAHs because shallow ground water had not been impacted and the presence of some of these compounds is likely related to fill material. Textron stated, however, that in situ bioremediation for VOCs would likely be effective in reducing the concentrations of TPHCs, BNs and PAHs.

In NJDEP's January 30, 1989 response letter to Textron's proposed remedial strategies, the agency approved the proposed in situ bioremediation feasibility study for reducing VOC contamination but indicated that this work should specifically include the treatment of TPHC contamination (in addition to VOCs), and not consider it only as a secondary benefit. NJDEP did not take exception to the conclusion reached for BNs and PAHs. In accordance with the agency's request, the treatment of TPHCs was evaluated as part of the feasibility study. The results of this work are provided in Section II.

2. Soil Contamination Related to On-Site Fill Materials

Several species of metals were found at background locations and from within the central and eastern portions of the site. However, their presence is believed to be associated with on-site fill materials rather than past industrial activities because none of the metals detected is known to have been used during the operating history of the site. In addition, the variability of metal concentrations and noted increases of metal concentrations with depth at several sampling locations are indicative of heterogeneous fill material rather than the effect of site operations. If the metals had been introduced into the soil by site activities, the higher concentrations would be expected in the near surface soil samples. The occurrence of PPMs is virtually limited to the central and eastern portions of the site, areas where distinct fill material exists. For these reasons, Textron recommended in its June 1988 report that any cleanup activity should not include PPMs in soils. NJDEP concurred with this position in its January 30, 1989 response letter to Textron.

As previously stated, some of the TPHC, BN or PAH contamination is likely associated with fill material because these compounds were detected in areas of the site where no apparent source exists. For example, significant concentrations of TPHCs were detected in soil samples collected from background areas. BNs or PAHs were also detected in several background or unexpected locations. The strategy for addressing these compounds and the agency's response were summarized in the preceding section.

3. Shallow Ground Water

Despite the presence of VOCs and TPHCs within the shallow soils of the fill unit, little contamination has been detected in the shallow ground water. The pavement which covers the majority of the site is preventing the infiltration of rain water from the surface, thus inhibiting the migration of contaminants from the soil matrix into the ground water. TPHCs at levels slightly above the informal ECRA action level are present only in the upgradient background wells and are attributable to off-site sources. With one exception, the only dissolved PPM detected at concentrations above the informal ECRA action level is selenium, the source of which appears to be Newark Bay. BNs have never been detected in ground water.

VOCs detected in the shallow ground water are for the most part related to contaminated on-site soils, but the impact appears to be limited in areal extent. VOCs have been detected only in 5 of 20 shallow wells (MW7, MW10, MW11, MW13, and MW20). Toluene and/or ethylbenzene were generally the detected constituents of concern, although low levels of benzene were occasionally reported. Except for MW10, the concentrations of total VOCs in the shallow ground water are relatively low. Based on the results of soil samples collected from MW10 and MW13 during well installation, it appears that the presence of VOCs in these wells is related to localized soil contamination. VOCs detected in MW20 are likely related to migration from MW10 or to nearby soil contamination. Low levels of VOCs detected in MW7 and MW11 could be related to migration from off-site sources of contamination or possibly to historical activities within the large tank farm (AEC 26).

As part of the Phase II Sampling Plan, mathematical analyses were performed to evaluate the potential migration of VOC contamination in the shallow aquifer. The results, presented in the June 1988 report, indicate that VOCs at the nearest receptor boundary (Newark Bay) would be insignificant and pose no risk to public health or the environment. Given these results, along with the fact that VOCs are present at relatively low levels in very limited areas of the site, ground water remediation was not proposed by Textron in the June 1988 report.

NJDEP indicated in its January 30, 1989 letter to Textron that the proposal to not remediate shallow ground water could not be accepted at this time because no actual soil remediation was proposed. Instead, NJDEP requested that Textron conduct quarterly ground water sampling from wells MW10, MW13, MW14, MW15 and MW20, and that this monitoring continue for a period of one year after source control/removal has been implemented. NJDEP stated that the need for ground water remediation will be evaluated at that time.

Textron continues to believe that shallow ground water remediation is not warranted for the reasons stated previously. In addition, if ground water cleanup were ultimately required, traditional pump and treat methods would be inappropriate due to off-site sources of contamination and the extensive tidal influence of Newark Bay. Pumping the ground water would only create a sink, drawing additional constituents to the site. Moreover, the source of VOCs affecting the shallow ground water should be extensively reduced if <u>in situ</u> bioremediation can be implemented successfully at this site. As discussed in Section II, results of preliminary laboratory and field testing for <u>in situ</u> bioremediation indicate that this soil treatment technology is a feasible and effective remedial method.

Consistent with NJDEP's request, however, quarterly ground water sampling from the referenced wells began in April 1989, and all data have been provided to the agency as it is acquired. A full analysis of the results of quarterly sampling will be made after implementation of the Cleanup Plan for soils.

4. Deep Ground Water

The analytical results of ground water samples collected from wells monitoring the deep aquifer indicated that the deep ground water beneath the site has not been affected by site activities. Lead, selenium and VOCs were detected at concentrations above the informal ECRA action levels in one monitoring well, but only during one of three sampling rounds. In addition, TPHCs at a concentration just slightly over the informal ECRA action level were detected in one other deep well during one sampling round. A number of factors likely caused the incidental detection of these compounds (field acidification of samples, tidal influence of Newark Bay, contamination during well installation, etc.), but none are linked to past industrial operations at the site. Therefore, no remedial action with respect to the deep aquifer is required or was proposed to NJDEP in the June 1988 report. The agency did not take exception to this conclusion in its January 30, 1989 letter.

7

TEXTRON

Textron Inc.

40 Westminster Street
Providence. R.I. 02903
401/421-2800

February 14, 1997

Mr. Pat Evangelista
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866

Re: Diamond Alkali Superfund Site,
Passaic River Study Area

Dear Mr. Evangelista:

Enclosed is Textron's response to EPA's information request dated December 24, 1996 regarding the above-referenced matter. An extension to respond until February 14, 1997 was granted by Ms. Amelia Wagner, Assistant Regional Counsel.

Sincerely,

Jamieson M. Schiff
Environmental Counsel

JMS:sas
Enclosure

AKH000027

Textron Inc.'s Response to EPA Request for Information
Diamond Alkali Superfund Site, Passaic River Study Area

Textron Inc. sold its former Spencer-Kellogg Division, including its former Newark plant at Doremus Avenue, over eleven years ago. As part of that transaction it transferred facility documents and records. Hence, Textron's ability to respond to EPA's information request, which seeks very detailed information concerning events in some cases twenty years ago, is necessarily limited. Additionally, the request in certain instances seeks information concerning events that preceded Textron's operation of the facility. Nevertheless, Textron has attempted to respond based upon reasonably available information given the burdens that EPA's request impose in relation often to the probative value of the information sought.

1) **How long has your company operated at the facility designated above? If your company no longer operates at this facility, during what years did your company operate at the facility?**

   Response:
   Textron Inc. (hereinafter "Textron") operated its Spencer Kellogg Division, Newark Resin Plant (hereinafter "the facility") from December 1978 to July 1985.

2) **a) Does your company have or has it in the past had a permit or permits issued pursuant to the Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq.? If "yes", please provide the years that your company held such a permit and its EPA Identification Number.**

   Response:
   According to a March 8, 1984 letter from the NJDEP (attached as Exhibit 1), Textron filed a RCRA Part A permit application in connection with a hazardous waste storage tank. To the best of Textron's knowledge, the facility was never issued a RCRA Part B operating permit during Textron's ownership. The facility's EPA I.D. number was NJD092217892.

   b) Does your company have or has it in the past had a permit or permits issued pursuant to the Federal Water Pollution Control Act, 33 U.S.C. §1251, et seq.? If "yes", please provide the years that your company held such a permit.

   Response:
   The facility held a Passaic Valley Sewerage Commissioners Permit from May 1981 to May 1986. See Permit No. 20401860, attached as Exhibit 2, and Textron's New Jersey

Environmental Cleanup Responsibility Act (ECRA) General Information Submission, attached as Exhibit 3.

3) **Did your company receive, utilize, manufacture, discharge, release, store or dispose of any materials containing the following substances:**

Response:
According to information contained in Exhibit 4 (Textron's ECRA Site Evaluation Submission and various raw material records), Textron received, stored and utilized the following substances in its production processes from 1978 to 1985:

	Yes	No
2,3,7,8 tetrachlorodibenzo-p-dioxin or other dioxin compounds		X
Acids: synethol acids, adipic acid, benzoic acid, phospheric acid, phosphoric acid, sulfuric acid, isophthalic acid, methacrylic acid, chlorendic acid, acrylic acid, fumaric acid and ammonium persulfate	X	
Ammonium hydroxide	X	
Benzene		X
Butanol	X	
Butyl acetate	X	
Ethanol	X	
Ethyl benzene	X	
Formaldehyde	X	
Methyl methacrylate	X	
Neopentyl glycol	X	
Phthalic anhydride	X	
other anhydrides, please specify maleic anhydride and trimellitic anhydride	X	
Polyaromatic hydrocarbons If "yes," please list specific compounds		X
Solvents, if "yes," please specify compound Aromatic Solvent 100, Aromatic Solvent 150, Aliphatic Solvent 140, VM&P naphtha, isoactylalcohol, methyl propyl ketone, MEK, isoparaffinic petroleum solvent and mineral spirits	X	
Styrene	X	
Toluene and vinyl toluene	X	
Xylene	X	
PCBs		X
Arsenic		X
Cadmium		X
Chromium		X
Copper		X

Lead	X
Mercury	X
Nickel	X
Silver	X
Zinc	X
Cyanide	X

For a discussion of substances that may have been released at the facility during historical operations, see response to Question 8.

4) **a) Provide a description of the manufacturing processes for which all hazardous substances, including, but not limited to, the substances listed in response to item (3), were a product or by-product.**

Response:
A description of Textron's manufacturing processes is contained in Exhibit 4, Textron's ECRA Site Evaluation Submission at Appendix 2.

b) During what parts of the manufacturing processes identified in the response to items (4)(a), above, were hazardous substances, including, but not limited to, the substances listed in response to item (3), generated?

Response:
Water of esterification was generated during resin reaction in Building 31. Since the reaction that produced this water was a reversible one, the water has to be removed from the process as it is generated. This was done by adding a reflux solvent (e.g., xylene or ethylbenzene) to form an azeotrope. The azeotrope allowed water to evaporate at temperatures below its normal boiling point. Overhead decanters were then used to collect the evaporated water. Until the early 1980's, this water was discharged directly to the Passaic Valley Sewerage Commission (PVSC) system. Beginning in the early 1980's, the water was separated from the sewer discharge line and piped to a receiving tank where the solvent was separated from the water. Any recovered solvent was then recycled back into the production process and the water was discharged to the sanitary sewer system. See Exhibit 4 at Appendix 2. Textron does not have information confirming the specific chemical composition of the esterification water.

Waste filter cake and press paper were generated during the filtration of finished products prior to filling in drums. The filter cake and press paper were transferred to open head drums, properly marked, closed and held for disposal until a full truck load (80 drums) accumulated. The chemical composition of the filter press waste was 30-50% diatomaceous earth, 30-50% filter paper, 10-20% waste resin and 0-10% organic solvents. When a full truck load of drums had been collected, the drums were opened, checked for liquids, closed and labeled with hazardous waste labels and flammable solid labels. The drums were then shipped, properly manifested, to a licensed TSDF for disposal. See Exhibit 4 at Appendices 2 and 8.

Cotton and/or nylon strainer bags were used to filter finished products prior to tank truck loading. The bags were thoroughly drained and disposed of with the drummed filter press waste. Drainings from the strainer bags were either recycled in the production process or collected as 1285 Premix and disposed as bulk hazardous waste, properly manifested, to a licensed TSDF. The chemical composition of the 1285 Premix was 10-60% organic solvents and 40-90% waste resin. See Exhibit 4 at Appendices 2 and 8.

Off-grade finished resin product was either collected in drums and resold as fuel or added over time to the 1285 Premix noted above for off-site disposal.

Waste solvent was generated from occasional cleaning of the process lines. This solvent was collected in drums and recycled back into the production process. According to former plant personnel, this waste solvent may have also been placed into the 1285 Premix drums at some point in the past. The time period during which this may have occurred is unknown.

The amounts of the waste generated per volume of finished product is unknown for all wastes noted above.

i) Describe the chemical composition of these hazardous substances.

Response:
See response to Question 4(b) above.

ii) For each process, what amount of hazardous substances was generated per volume of finished product?

Response:
See response to Question 4(b) above.

iii) Were these hazardous substances combined with wastes from other processes? If so, wastes from what processes?

Response:
See response to Question 4(b) above.

5) Describe the methods of collection, storage, treatment, and disposal of all hazardous substances, including, but not limited to, the substances listed in response to item (3) and (4). Include information on the following:

Response:
See response to Question 4b above.

a) Identify all persons who arranged for and managed the processing, treatment, storage and disposal of hazardous substances.

Response:
According to Textron's April 17, 1985 Hazardous Waste Contingency Plan contained in Exhibit 4, ECRA Site Evaluation Submission at Appendix 9, the following persons may have been involved in the processing, treatment, storage and disposal of hazardous wastes at the facility during Textron's period of ownership. The addresses and telephone numbers listed below for these former employees are those that were last known to Textron:

Arthur Dieffenbach
Plant Superintendent
Sebring Avenue
Bound Brook, NJ 08805
469-1509

Richard Barr
Plant Engineer
84 Shore Road
Andover, NJ 07821
(201) 852-5003

John Brooks
Plant Manager
Devon Road
Colonia, NJ 07067
381-6706

Scott Johnston
Process Engineer
111 West 7th Avenue, Apt. 8
Roselle, NJ 07203
(201) 245-4887

b) If hazardous substances were taken off-site by a hauler or transporter, provide the names and addresses of the waste haulers and the disposal site locations.

Response:
Textron objects to this request on the grounds that it is overbroad, unduly burdensome and not reasonably calculated to lead to the production of relevant information.

c) Describe all storage practices employed by your company with respect to all hazardous substances from the time operations commenced until the present. Include all on-site and off-site storage activities.

Response:
The information provided below is contained in Exhibit 4, ECRA Site Evaluation Submission at Appendices 1, 2, 3, 4 and 7. For a facility map refer to Exhibit 4 at Appendix 1.

Most dibasic acids and some polyols were received in 50 lb. bags by truck, unloaded at the west end of Building 31/32, and moved into the first floor of the building for temporary storage. These materials were then moved to the fifth floor of the building for more permanent storage.

Hydrocarbon solvents, and alcohols used as solvents, were delivered in both tank trucks and 55-gallon drums. Tank trucks were unloaded into above ground storage tanks located in the tank farm east of Building 31. Drums were unloaded and stored on pallets in the outside yard area east of Building 25 or on the fifth floor of Building 32.

Phthalic anhydride was received in tank trucks and unloaded into aboveground storage tanks located east of Building 31.

Trimethyl propane and vinyl toluene were unloaded from either rail cars or tank trucks into above ground storage tanks located between Buildings 4 and 25.

Generally, bulk raw materials that were unloaded into storage tanks around the plant were subsequently transferred via above ground piping to storage tanks located on the fourth floor of Building 31/32. Occasionally, solvents were transferred via above ground piping directly into the thinning tanks located on the first floor of Building 31/32.

Drums of waste filter cake and press paper were transported via elevator and lift truck from the third floor of Building 31/32 to the first floor of Building 13 where they were held for disposal.

Strainer bag drainings and off-grade finished resin product (1285 Premix) were stored in one large above ground tank, or in 55-gallon drums located on a cement pad, prior to off-site disposal.

Drums of finished products were stored in an area on the second floor of Building 31 or in storage tanks located throughout the plant.

i) If drums were stored outside, were the drums stored on the ground or were they stored on areas that had been paved with asphalt or concrete? Please provide a complete description of these storage areas.

Response:
The drums stored by Textron outside the manufacturing building were stored on pallets. The facility was almost entirely paved during Textron's period of ownership.

ii) When drums were stored outside, were empty drums segregated from full drums?

Response:
Textron has no information or documents indicating whether empty drums were segregated from full drums during outside storage operations.

d) What processes do you use to treat your waste? What do you do with the waste after it is treated?

Response:
According to available information, and other than the separation of water from reflux solvent discussed in Question 4, Textron did not treat its waste streams prior to disposal.

6) **a) For process waste waters generated at the facility which contained any hazardous substances, including, but not limited to, the substances listed in response to item (3) and (4):**

i) Was the waste stream discharged into a sanitary sewer and if so, during what years?

Response:
According to available information, the only operations that generated waste waters were the coating resin manufacturing processes conducted in Building 31/32. Water of esterification from these operations was discharged to the PVSC sanitary sewer system. These discharges continued throughout Textron's ownership of the facility.

ii) Were they treated before being discharged to the sanitary sewer and if so, how? Please be specific.

Response:
Process waste waters that were discharged to the sanitary sewer system were not pretreated until the early 1980s. The subsequent pretreatment consisted of separating reflux solvent from the water. This was the only "treatment" of waste waters that Textron conducted during its ownership of the facility.

iii) If the waste waters were not discharged to the sanitary sawer, where were they disposed and during what years?

Response:
No waste waters were discharged to locations other than the sanitary sewer system.

iv) Please provide the results of any analyses performed on any waste process streams generated at the facility.

Response:
Sampling of waste waters in the early 1980s consisted of measurements of the lower explosive limit (LEL) as required by the PVSC. Textron was unable to locate copies of these analyses.

v) EPA has information that in 1976 a sanitary sewer line at your facility ruptured causing process waste water to discharge into adjacent surface water. Please provide a detailed description of this incident including the nature and content of the waste water, the results of sampling and any steps taken to mitigate the effects of the discharge.

Response:
This incident would have occurred before Textron's ownership and operation of the facility, since Textron did not acquire the facility until December 1978. All the information Textron has concerning this incident is contained in the enclosed Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Textron is not aware of any sampling or remediation that was conducted in response to this incident.

b) For floor drains or other disposal drains at the facility:

i) Did the drains connect to a sanitary sewer and if so, during what years?

ii) If the floor drains or other disposal drains at the facility were not discharged to the sanitary sewer, where did they discharge and during what years?

Response:
Floor drains in Building 31/32 were connected to the sanitary sewer system at the time of Textron's purchase of the facility in December 1978 until 1985 when Textron sealed these drains. Other than these floor drains, Textron is not aware of any other floor drains at the facility that were used for the disposal of waste waters. Textron believes that any remaining floor drains at the facility also would have discharged to the sanitary sewer system.

c) i) Did any storm sewers, catch basins or lagoons exist at any time at the facility and if so, during what years?

Response:
Textron has no knowledge of the existence of lagoons at the facility. Storm sewers and associated catch basins exist at the facility. Textron is not aware of the installation date(s) of these structures. No other catch basins exist at the facility.

ii) If catch basins or lagoons existed, were they lined or un-lined?

Response:
The storm water catch basins that existed at the facility during Textron's ownership were lined with concrete.

iii) What was stored in the lagoons?

Response:
Not applicable.

iv) Where was the discharge from any of these structures released and during what years? Was this discharge treated before its release and if so, how and during what years? What was the chemical composition of any waste waters released, and during which years?

Response:
All storm water from the storm sewers and associated catch basins was discharged to the Passaic River. Textron did not pretreat the storm water prior to its discharge nor conduct any sampling of the storm water that was discharged to these structures. Textron did not discharge any process waste waters to the storm sewers and catch basins.

d) Please supply diagrams of any waste water collection, transport or disposal systems on the property.

Response:
A diagram of the storm water collection and conveyance system is provided on Plate 1 in the March 1987 report contained in Exhibit 7.

7) **a) For each hazardous substance, including, but not limited to, the substances *listed in response to item (3) or identified in the responses to item (4), above,* provide the total amount generated during the operation of the facility on an annual basis.**

Response:
Exhibit 4, ECRA Site Evaluation Submission at Appendix 2, indicates that approximately eighty 55-gallon drums of filter cake, press paper and strainer bag waste were generated per month by the facility. The annual volume of esterification water, strainer bag drainings and process line solvent washings generated is unknown.

b) Were any hazardous substances, including, but not limited to, the substances listed in response to item (3) or identified in the responses to item (4), above, disposed of in the Passaic River or discharged to the Passaic River? If yes, identify the hazardous substances, estimate the amount of material discharged to or disposed of in the Passaic River and the frequency with which this discharge or disposal occurred. Also please include any sampling of the river which you might have done after any discharge or disposal.

Response:
To the best of Textron's knowledge, no hazardous substances were intentionally disposed of in, or discharged to, the Passaic River during Textron's ownership of the facility.

8) **Please identify any leaks, spills, explosions, fires or other incidents of accidental material discharge that occurred at the facility during which or as a result of which any hazardous substances, including, but not limited to, the substances listed in response to item (3) or (4), were released on the property, into the waste water or storm drainage system at the facility or to the Passaic River. Provide any documents or information relating to these incidents, including the ultimate disposal of any contaminated materials.**

Response:
Accidental discharges of hazardous substances to the property, to the waste water or storm water systems, or to the Passaic River during Textron's ownership of the facility are discussed in (b) and (c), below. Textron is also aware of one such release that occurred subsequent to Textron's ownership of the facility. In November 1991, during Textron's implementation of a soil remediation project conducted during the ECRA proceeding at the facility, a thin layer of free-phase resinous material was encountered on the water surface during excavation of soils to the water table along the northern railroad siding at the facility. Subsequently, following a period of heavy rainfall and high tides, a small amount of this material (i.e., less than 5 gallons) was released to the Passaic River. Textron's contractors immediately contained the spill with collection booms. The NJDEP was notified consistent with N.J.A.C. 7:1E-5.3 and there were no enforcement actions taken. Textron filed a spill report with the NJDEP dated December 20, 1991. See Exhibit 5, Monthly ECRA Progress Report dated December 16, 1991. Textron has not been able to locate a copy of the spill report.

a) Please provide the results of any sampling of the soil, water, air or other media after any such incident and before and after clean-up. Please provide in this information all sampling performed for or by NJDEP.

Response:
Textron is not aware of any sampling, including sampling by or for the NJDEP, that was conducted during its ownership of the facility to address any accidental discharges of hazardous substances to the property, into the waste water or storm water systems, or to the Passaic River. Further, no sampling of environmental media was conducted in response to the accidental discharge of resinous material to the Passaic River in November 1991.

b) EPA has information that in 1977, 1978 and 1979 there were three separate incidents involving the discharge of resin to the facility's property or to adjacent surface waters. Please provide detailed descriptions of these incidents including the constituents of the discharged material, how the discharge occurred, any steps taken to mitigate the effects of the spills, and any actions taken to prevent further occurrences. Please include any sampling results.

Response:
The only documented discharges of resin that Textron is aware of are described in Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Accidental spills and leaks of various materials may have occurred during the manufacture and storage of coating resins at the time Textron owned the facility. Areas potentially impacted by these spills were addressed as a part of the ECRA investigation. See response to Question 12 for further information regarding these areas.

c) Please describe in detail all spills of phthalic anhydride onto the facility's property or into adjacent surface waters. Please describe how the discharge occurred, any steps taken to mitigate the effects of the spills, and any actions taken to prevent further occurrences.

Response:
Spills of phthalic anhydride that occurred during Textron's ownership of the facility are described in Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Areas potentially impacted by these spills were addressed as a part of the ECRA investigation. See response to Question 12 for further information regarding these areas.

9) **a) Was your facility ever subject to flooding. If so, was the flooding due to:**

i) overflow from sanitary or storm sewer back-up, and/or

ii) flood overflow from the Passaic River?

b) Please provide the date and duration of each flood event.

Response:
Textron is not aware of any flooding which occurred at the facility during Textron's period of ownership.

10) **Please provide a detailed description of any civil, criminal or administrative proceedings against your company for violations of any local, State or federal laws or regulations relating to water pollution or hazardous waste generation, storage, transport or disposal. Include information on the Administrative Consent Order, ECRA Case #85403. Provide copies of all pleadings and depositions or other testimony given in these proceedings.**

Response:
A copy of the Administrative Consent Order for ECRA Case No. 85403 is attached as Exhibit 6. Textron does not possess copies of any pleadings, depositions or testimony given in this matter.

The Coast Guard assessed a $50 fine to Textron as a result of a September 10, 1979 spill of an unknown amount of resin at the facility which entered an underground flume and discharged into Newark Bay. See Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Textron does not possess copies of any pleadings, depositions or testimony related to this matter.

11) **Provide a copy of each document which relates to the generation, purchase, use, handling, hauling, and/or disposal of all hazardous substances, including, but not limited to, the substances listed in response to item (3) or (4). If you are unable to provide a copy of any document, then identify the document by describing the nature of the document (e.g. letter, file memo, invoice, inventory form, billing record, hazardous waste manifest, etc.). Describe the relevant information contained therein. Identify by name and job title the person who prepared the document. If the document is not readily available, state where it is stored, maintained, or why it is unavailable,**

Response:
Textron objects to this question on the grounds that it is overbroad, unduly burdensome, and not reasonably calculated to lead to the production of relevant information.

12) **a) Did you or anyone else sample the soil, ground water, surface water, ambient air or other environmental media at the facility for purposes other than those identified in questions above?**

Response:
Textron and its agents have collected samples of soil, ground water, surface water and ambient air in compliance with the requirements of ECRA under Case No. 85403 during numerous phases of sampling and cleanup. Textron has not collected samples of other environmental media as part of this ECRA proceeding.

b) If so, please provide all other documents pertaining to the results of these analyses.

Response:
Attached herein as Exhibit 7 are the relevant documents that provide the results of the soil, ground water, surface water and ambient air sampling conducted by Textron under ECRA Case No. 85403. These documents are:

- 1987, March. ENVIRON Corporation. *Presentation of the ECRA Sampling Plan Results.* Volumes I and II.
- 1988, June. ENVIRON Corporation. *Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan.* Volume I.
- 1990, October. ENVIRON Corporation. *Presentation of Additional ECRA Sampling Results and Revised Cleanup Plan.* Volume I.
- 1990, December 27. Letter to M. Fisher of the NJDEP providing results of quarterly ground water monitoring.
- 1991, April 12. Letter to S. Balakrishnan of the New Jersey Department of Environmental Protection (NJDEP) presenting results of pre-remediation and quarterly ground water sampling.
- 1991, May 22. Letter to S. Balakrishnan of the NJDEP presenting results of additional pre-remediation soil sampling.
- 1991, September 16. ENVIRON Corporation. Letter and progress report to S. Balakrishnan of the New Jersey Department of Environmental Protection (NJDEP) providing results of pre-remediation sampling.
- 1992, July. Canonie Environmental. *Final Report on Soils Remediation.*

- 1994, January 12. ENVIRON Corporation. Letter to M. Buriani of the NJDEP providing summarized results of the four rounds of post-cleanup quarterly ground water monitoring.

- 1995, January 17. ENVIRON Corporation. Letter to M. Buriani of the NJDEP presenting results of confirmatory soil sampling and ground water sampling in and around Building 31/32.

- 1995, July. ENVIRON Corporation. *Presentation of the April-May 1995 Ground Water Sampling Program Results and Proposed Remedial Action Work Plan.*

13) a) Has your company owned the facility at the location designated above? If so, from whom did your company purchase the property and in what year? If your company subsequently sold the property, to whom did your company sell it and in what year? Please provide copies of any deeds and documents of sale.

Response:
Textron owned the Spencer Kellogg Division, Newark Resin Plant from December 1978 to July 1985. Textron purchased the property from Ashland Oil, Inc. and sold it to NL Industries, Inc. A copy of the deed from Ashland Oil reflecting the purchase of the property is attached as Exhibit 8. Textron can not locate at this time a copy of the deed it transferred to NL Industries reflecting the property's sale.

b) If your company did not own the facility, from whom did your company rent the facility and for what years? Please provide copies of any rental agreements.

Response:
Not applicable.

c) To the extent that you know, please provide the names of all parties who owned or operated the facility during the period from 1940 through the present. Describe the relationship, if any, of each of those parties with your company.

Response:
The names and dates of ownership of the facility from 1940 through the present are as follows. None of these entities (other than Textron Inc.) are related to Textron Inc.:

1943 - 1951	U.S. Industrial Chemical, Inc.
1951- 1954	National Distillers Products
1954 - 1968	Archer-Daniels-Midland Co.
1968 - 1978	Ashland Oil, Inc.
1979 - 1985	Textron Inc.
1985 - 1989	NL Industries, Inc.
1989 - Present	Reichhold Chemicals, Inc.

14) Answer the following questions regarding your business or company. In identifying a company that no longer exists, provide all the information requested,

except for the agent for service of process. If your company did business under more than one name, list each name.

a) State the legal name of your company.

b) State the name and address of the president or the chairman of the board, or other presiding officers of your company.

c) Identify the state of incorporation of your company and your company's agent for service of process in the state of incorporation and in New Jersey.

d) Provide a copy of your company's "Certificate of Incorporation" and any amendments thereto.

e) If your company is a subsidiary or affiliate of another company, or has subsidiaries, or is a successor to another company, identify these related companies. For each related company, describe the relationship to your company; indicate the date and manner in which each relationship was established. Please include in any explanation, the details of the relationship between Spencer-Kellogg and Textron.

f) Identify any predecessor organization and the dates that such company became part of your company.

g) Identify any other companies which were acquired by your company or merged with your company.

h) Identify the date of incorporation, state of incorporation, agents for service of process in the state of incorporation and New Jersey, and nature of business activity, for each company identified in the responses to items (14) (e), (f), and (g), above.

i) Identify all previous owners or parent companies, address(es), and the date change in ownership occurred.

Response:
Textron objects to this request on the grounds that it is overbroad, unduly burdensome and not reasonably calculated to lead to the production of relevant information. Without waiving its objection, Spencer-Kellogg was a former division of Textron Inc. from December 1978 until July 1985. Textron Inc. is a publicly held company, incorporated under the laws of Delaware, and headquartered in Providence, RI. Enclosed is a copy of its most recent annual report. Its agent for service of process in New Jersey is The Corporation Trust Company, 820 Bear Tavern Road, West Trenton, NJ 08628.

15) Provide the name, address, telephone number, title and occupation of the person(s) answering this "Request for Information" and state whether such person(s) has personal knowledge of the responses. In addition, identify each person who assisted in any way in responding to the "Request for Information"

and specify the question to which each person assisted in responding. Please include the names and addresses of former employees who were contacted to respond to any of the questions.

Response:
The following persons assisted in the preparation of the responses to this Request for Information. Scott MacDonald and William Kraft have knowledge of the former Textron facility through conducting extensive work as part of the ECRA/ISRA investigation at the facility. Elizabeth Sanders assisted Mr. MacDonald and Mr. Kraft with the response.

Scott MacDonald, Manager
William Kraft, Senior Associate
Elizabeth Sanders, Technical Assistant
ENVIRON Corporation
Carnegie Center
Princeton, New Jersey 08540

Jamieson Schiff, Environmental Counsel, Textron Inc., 40 Westminster Street, Providence, Rhode Island 02903, also assisted.

Exhibit 1

945990071

ATTACHMENT 4

CERTIFIED MAIL
#P439576265
RETURN RECEIPT REQUESTED

Received 3/12/84

CL FR B
SWH

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WASTE MANAGEMENT
32 E. Hanover St., CN 028, Trenton, N.J. 08625

DR MARWAN M. SADAT, P.E.
DIRECTOR

0 8 MAR 1984

LINO F. PEREIRA, P.E.
DEPUTY DIRECTOR

Mr. Arthur E. Dieffenbach, Plant Superintendent
Spencer Kellogg Division of Textron, Inc.
400 Doremus Avenue
Newark, New Jersey 07105

RE: Facility Status of Spencer Kellogg, Newark, New Jersey, EPA ID NO. NJD092217892

Dear Mr. Dieffenbach:

The Bureau of Hazardous Waste Engineering (the Bureau) acknowledges receipt of your letter dated January 30, 1984 which contains a delisting request for the tank storage (S02) hazardous waste activity that your company filed for in its RCRA Part A application.

Your delisting request for Spencer Kellogg is based on a proposal that the bulk storage tank identified as T-309 which is now in premix (hazardous waste) service be taken out of service (closure of this facility). After tank T-309 closure is implemented, a 6000 gallon tank that is normally used for product bulk shipments would be used on an intermittent basis to hold i.e. store premix material before disposal off-site when sufficient quantity of premix has been accumulated to schedule removal by tank truck. Prior to transfer of premix (waste) to the product storage tank, this material would be temporarily accumulated in drums. After each shipment of the hazardous waste from the 6000 gallon tank, it would be returned to product storage service until the need for waste storage in this tank recurs.

The Bureau has reviewed your delisting request and after due consideration, made the following determinations:

1) Spencer Kellogg plans to continue utilizing a tank for accumulation of hazardous waste prior to disposal off-site.

2) The change in the name given to the tank to be employed for the handling of hazardous waste does not alter the nature of its intended use.

3) N.J.A.C. 7:26-9.3 allows for accumulation of hazardous waste in containers only for 90 days or less without a permit. New Jersey Hazardous Waste Management Regulations do not allow exemption for accumulation of wastes in tanks regardless of the time limit involved.

AKH000044

4) When you and Messrs. Smith and Brooks met at the DEP offices with Messrs. Kuhlwein and Esterman of my staff on October 4, 1983, various methods of waste handling were discussed. The distinction between use of tanks vs. containers for handling of wastes and their relevance to delisting potential was stressed in the conversations.

If there is any misunderstanding of the facts noted above, please inform this Bureau immediately. Based on the assumption that the above understanding is correct, this Bureau has drawn the following conclusions:

1) Your were previously informed by letter dated August 17, 1983 that your S01 process was delisted because it only reflects the storage of hazardous waste in drums for a period of ninety (90) days or less.

2) You were also informed in DEP's 8/17/83 letter that your facility was not excluded from regulations under N.J.A.C. 7:26-1 et seq. because its S02 process constitutes a TSD activity.

3) The proposals contained in your submittal of January 30, 1984 will result in a continuation of the S02 process (tank storage) for hazardous waste at your facility - TSD activity.

4) The closure plan that you submitted for S02 process cannot be considered at this time because your "closure" plan calls for substituting a 6000 gallon tank in place of tank T-309 while continuing S02 (hazardous waste tank storage) activity. However, when you take tank T-309 out of service, you should notify the Department and provide the following information:

   a) The date when waste was no longer put into tank T-309
   b) Quantity of waste removed from the tank and method of disposal
   c) Means taken to decontaminate the facility (equipment)
   d) Steps taken to assure that human health and the environment are protected from this facility henceforth

As a result of the conclusions previously drawn, your company's hazardous waste facility continues to be included in DEP's list of "existing TSD facilities" (see N.J.A.C. 7:26-1.4 and 12.3) and therefore must conform with the interim operating requirements of N.J.AC. 7:26-1 et seq. for "existing facilities". These requirements include:

1) Establishment of financial assurance for closure as per N.J.A.C. 7:26-9.10

2) Demonstration of financial responsibility for claims as per N.J.A.C. 7:26-9.13

3) Submission of TSD facility annual report in compliance with N.J.A.C. 7:26-7.6(f)2

The following is a summary of the closure mechanisms that are allowed for existing facilities under N.J.A.C. 7:26-9.10:

1) Closure Trust Fund (N.J.A.C. 7:26-9.10(f)1)

2) Surety Bond guaranteeing payment into a closure trust fund (N.J.A.C. 7:26-9.10(f)2)

AKH000045

3) Closure Letter of Credit and establishment of a Standy Trust Fund at the time the letter of credit is obtained (N.J.A.C. 7:26-9.10(f)4)

4) Closure Insurance (N.J.A.C. 7:26-9.10(f)5)

The following is a summary of acceptable means to demonstrate financial responsiblity for sudden and accidental occurrences under N.J.A.C. 7:26-9.13:

1) Submission of an originally signed duplicate of the insurance policy. This policy must be either:

   a) Amended by attachment of an originally signed duplicate of a Hazardous Waste Facility Liability Endorsement; or

   b) An originally signed duplicate of a Certificate of Liability Insurance must accompany the policy as evidence of the coverage.

2) Passing a financial test for liability coverage according to N.J.A.C. 7:26-9.13(f).

3) Use of a combination of insurance and financial test.

In order to comply with the New Jersey Hazardous Waste Management Regulations regarding financial requirements, you should select appropriate documents from those mechanisms listed above and submit them to this Bureau within forty-five (45) days from the date of your receipt of this letter. A copy of the Wording of Instruments guidelines N.J.A.C. 7:26-9 (Appendix A) is enclosed to aid you in preparation of the financial documents. The wording of instruments must be exactly as shown in the "guidelines".

If you should have any questions on any of these matters, please contact Mr. Benjamin Esterman of my staff at (609) 984-4061.

Very truly yours,

Frank Coolick

Frank Coolick, Chief
Bureau of Hazardous Waste Engineering

EP14/j20b5-7

Enclosures

AKH000046

8

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
BUREAU OF INDUSTRIAL SITE EVALUATION

2886
SES
1985

ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT (ECRA)

APPLICATION FOR ECRA REVIEW
INITIAL NOTICE

SITE EVALUATION SUBMISSION (SES)

Site Evaluation Submission

This is the second part of a two-part application submittal and must be submitted within 30 days following public release of the decision to close operations or execution of an agreement of sale or option to purchase.

DATE August 23, 1985

NAME OF INDUSTRIAL ESTABLISHMENT Spencer Kellogg Newark Resin Plant

ADDRESS 400 Doremus Avenue

CITY OR TOWN Newark ZIP CODE 07105

MUNICIPALITY ______ COUNTY Essex

NAME OF PROPERTY OWNER NL Spencer Kellogg Inc., formerly owned by Spencer Kellogg Division of Textron Inc.

FIRM: NL Spencer Kellogg Inc.

DRESS: 1230 Avenue of the Americas

TY OR TOWN: New York ZIP CODE: 10020

MUNICIPALITY ______ COUNTY New York

SUBMIT THE ORIGINAL PLUS TWO COPIES OF THE FOLLOWING:
(NOTE: ITEM FOURTEEN (14) REQUIRES THREE COPIES)

9. A scaled site map identifying all areas where hazardous substances or wastes have been or currently are generated, manufactured, refined, transported, treated, stored, handled or disposed, above or below ground.

IS THIS MAP ENCLOSED? X YES (See Appendix # 1) ☐ NO

10. A detailed description of the most recent operations and processes at the industrial establishment organized in the form of a narrative report designed to guide the Department step-by-step through a plant evaluation, with particular emphasis on areas of the process stream where hazardous substances and wastes are generated, manufactured, refined, transported, treated, stored, handled or disposed on site, above or below ground. Also identify any floor drains with their points of discharge, septic systems if applicable, seepage pits and dry wells. Please note that establishments which ceased production prior to December 31, 1983, but are subject to ECRA because of on-going storage beyond that date, must provide details on past operations.

IS THIS REPORT ENCLOSED? X YES (See Appendix # 2) ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): ______

AKH000066

FOR DEP USE ONLY

Notice No. ______

11. A. A description of the types, age (installation date), construction material, capacity, contents, and locations of storage vessels, surface impoundments, landfills, or other types of storage facilities, including drum storage, containing hazardous substances or wastes.

ARE THESE FACILITIES IDENTIFIED ON YOUR SITE MAP OR DESCRIBED IN A NARRATIVE REPORT?
X YES (See Appendix # 3) ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): ____

B. The integrity of all underground tanks which contain hazardous wastes or substances must be verified. This may be accomplished in one of several ways: a) Performance of a satisfactory leak test in conformance with Criterion 329 of the National Fire Protection Association, or; b) Performance of subsurface soil investigation (soil borings and analysis), or; c) Excavate and remove the tank and establish the absence of contamination, or; d) other methods approved by the NJDEP.

ARE THE RESULTS OF THE LEAK DETECTION TEST OR THE SUBSURFACE INVESTIGATION ENCLOSED?
☐ YES (See Appendix # ____) X NO

IF YOU HAVE CHECK "NO", STATE THE REASON(S): Subsurface soil investigation will be conducted according with the sampling plan in order to determine the integrity of all underground tanks.

12. A complete inventory of hazardous substances and wastes, including description and locations of all hazardous substances or wastes generated, manufactured, refined, transported, treated, stored, handled or disposed on site, above and below ground, and a description of the location, types and quantities of hazardous substances and wastes that will remain on site. (Attach additional sheets if necessary.) Review N.J.A.C. 7:1E, Appendix A and N.J.A.C. 7:26-8 prior to completing to ensure that all defined hazardous materials are included.

MATERIAL	QUANTITY	LOCATION	STORAGE METHOD	TO REMAIN ON SITE (Yes or No)
See Appendix 4				

AKH000067

945990077

13. A. A detailed description, date and location on a scaled map of any known spill or discharge of hazardous substances or wastes that occurred during the historical operation of the site and a detailed description of any remedial actions undertaken to handle any spill or discharge of hazardous substances or wastes. (Attach additional sheets if necessary.)

IS THIS INFORMATION ENCLOSED? X YES (See Appendix # 5) ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): ______

______

______

______

ARE THE SPILLS IDENTIFIED ABOVE INDICATED ON THE SCALED SITE MAP? X YES ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): ______

______

______

______

13 B. If this facility has an approved Spill Prevention Control and Countermeasure Plan (SPCC), enclose a copy with this submittal.

IS YOUR SPCC PLAN ENCLOSED? X YES (See Appendix # 6*)
☐ NO, this facility is not required to have an SPCC plan

14. A. A detailed sampling or other environmental evaluation measurement plan which includes proposed soil, groundwater, surface water, surface water sediment, and air sampling determined appropriate for the site. (This sampling plan must be developed in conformance with ECRA Regulations N.J.A.C. 7:1-3.14 et seq., and Quality Assurance Guidelines as developed by DEP)

ARE THREE COPIES OF THE SAMPLING PLAN ENCLOSED? X YES (See Appendix # 7)
☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): ______

______

______

______

14. B. If the sampling plan includes groundwater sampling and/or the installation of monitoring wells, the applicant must complete a "Request for Hydrogeologic Assessment" form (blank form attached).

IS GROUNDWATER SAMPLING PROPOSED? X YES ☐ NO

IS THE "REQUEST FOR HYDROGEOLOGIC ASSESSMENT" FORM ATTACHED? X YES (See Appendix # 8)
☐ NO

* The plant's Hazardous Waste Contingency Plan is included as Appendix 9.

AKH000060

945990078

IF YOU HAVE CHECKED "NO". STATE THE REASON(S): ______________________

15. A detailed description of the procedures to be used to decontaminate and/or decommission equipment and buildings involved with the generation, manufacture, refining, transportation, treatment, storage, handling, or disposal of hazardous wastes or substances including the name and location of the transporter, the ultimate disposal facility, and any other organizations involved.

IS THE DETAILED DESCRIPTION ENCLOSED? ☐ YES (See Appendix # ____) ☒ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): New owner intends to use the facility in essentially the same manner.

16. Copies of all previous soil, groundwater and surface water sampling results, including effluent quality monitoring, conducted at the site of the industrial establishment during the history of ownership/operation by the owner or operator. Also include a detailed description of the location, collection, chain of custody, methodology, analyses, laboratory, quality assurance/quality control procedures, and other factors involved in preparation of the sampling results.

ARE HISTORICAL RESULTS ENCLOSED? ☐ YES (See Appendix # ____) ☒ NO

IF YOU HAVE CHECKED "NO". STATE THE REASON(S):

No previous testing

17. List any other information you are submitting or which has been formally requested by this agency:

Appendix 9 - The facility's Hazardous Waste Contingency Plan.

(See following page)

I hereby certify that this application and any attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true. I am aware that false swearing is a crime in the State of New Jersey. I am cognizant that knowingly providing false information is a violation under ECRA and that "any officer or management official of an industrial establishment who knowingly directs or authorizes the violation of any provisions" of ECRA may be personally liable for penalties of up to $25,000 per day.

TEXTRON INC.

By: John L. Morse

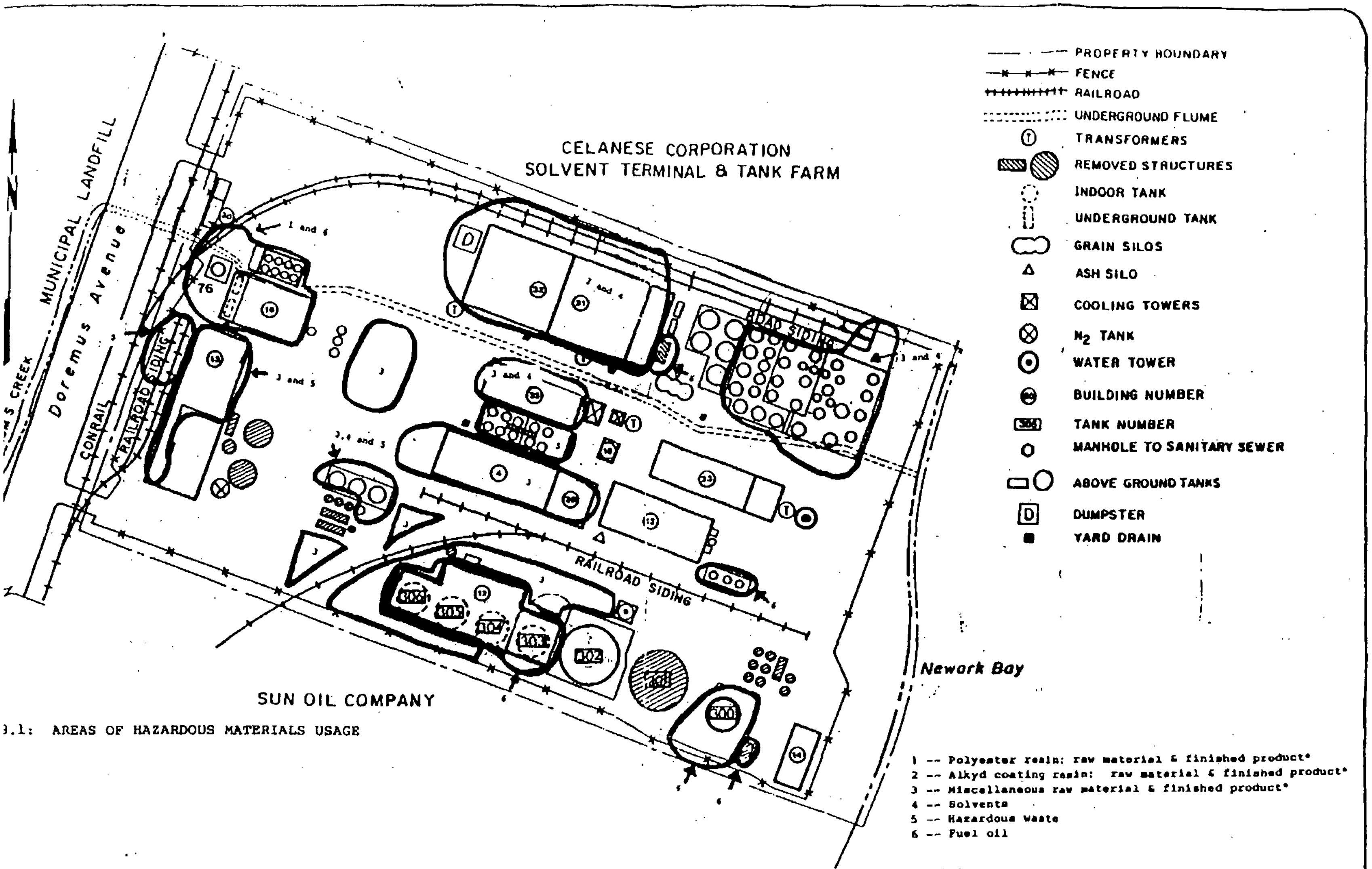
John L. Morse, Vice President
Risk Management Insurance

August 23, 1985
Date

AKH000070

945990080

Appendix 1



3.1: AREAS OF HAZARDOUS MATERIALS USAGE

I MAP FOR IDENTIFICATION IN TANK FARM.

Appendix 2

PLANT PROCESS DESCRIPTION ECRA FORM II - #10

The Spencer Kellogg Newark, N.J. Plant is engaged in the manfacture of coating resins used primarily in the paint industry. Raw materials, consisting mainly of vegetable oils, polyols, dibasic acids and anhydrides and various solvents are received in both bulk and packaged quantities. The vegetable oils are received by either rail car or tank truck and are unloaded into storage tanks in the tank farm area east of Bldg. 31. Glycerine (a polyol) and phthalic anhydride are received in tank trucks and unloaded into storage tanks in the same area. Most dibasic acids and some other polyols are received in 50 lb bags by truck and are unloaded at the west end of Bldg. 32 for storage. In addition, trimethylol propane (a polyol) and vinyl toluene (a monomer) are unloaded from either rail cars or tank trucks into storage tanks located between buildings 4 and 25.

Hydrocarbon solvents and alcohols, used as solvents, are received in the plant in both tank truck and 55 gallon drums. Tank trucks are unloaded into storage tanks in the tank farm east of Bldg. 31. Drum quantities are unloaded and stored on pallets in the outside yard area east of Bldg. 25 or on the fifth floor of Bldg. 32.

These bulk raw materials are combined by pumping thru closed piping systems to meters and/or weigh tanks and are then charged to one of the resin reactors located on the fourth floor of Bldg. 31. Bagged raw materials are manually charged to the resin reactor from the 5th floor of Bldg. 31. This raw material charge is reacted at temperatures between 250°F and 600°F to form a resin product. During this reaction period some water of esterification is formed which is separated from solvents and other organics in a receiver tank. The water of esterification is then discharged to the Passaic Valley Sewerage Commission System.

The finished resin products are then partly diluted with various solvents in the resin reactors and transferred to a resin thin tank to which additional quantities of solvents are added in order to adjust products to specifications. These solvents are pumped directly to the thin tank through a solvent meter that determines quantity of solvent added to the thin tank. The thin tanks are located on the three lower floors of Bldg. 31. The products are then filtered using a paper dressed, plate and frame filter press, to drums on the second floor of Bldg. 31 or to stroage tanks located throughout the plant.

During the filtration a quantity of diatomaceous earth is added to the thin tank to aid in the filtration. When filtration is completed, the filter press is blown dry with nitrogen gas and the filter cake and press paper are removed from the press on the third floor of Bldg. 31 and 32. This press cake and paper are transferred to open head drums of hazardous waste. The drums are properly stencilled and closed. They are then transported via elevator and lift truck to the first floor of Bldg. 13 where they are held for disposal until a full truck load quantity is accumulated (approximately once per month). When a full truck load (80 drums) has been collected, the drums are opened, checked for liquids etc., closed, and labelled with hazardous waste labels and flammable solid labels. They are then shipped, properly manifested, to a Chemical Waste Management site at Emelle, Alabama for proper disposal. There are no hazardous wastes disposed of at the Newark site.

945990084

The products produced are loaded into drums in a drumming area on the second floor of Bldg. 31 or loaded into tank trucks from storage tanks at various locations throughout the plant. These locations for tank truck loading are (1) west end of Bldg. 4, (2) south side of Bldg. 31, (3) north side of Bldg. 25, and (4) south side of tank farm that is located east of Bldg. 31. On occasion, lines must be washed with solvents and this solvent is collected in drums and recycled back into our process.

Tank truck loading of products requires straining of product through a strainer bag of cotton and/or nylon. These bags are thoroughly drained and disposed of with filter press waste as hazardous waste. Bag drainings are recycled to the process or collected as 1285 premix which is then disposed of as bulk liquid hazardous waste, properly manifested to Solvents Recovery Service in Linden, N.J.

Appendix 3

TANK FARM INVENTORY

TANK NO.	PRODUCT	CAPACITY	GPI	INSTALLED	MATERIAL RECD. BY	TANK CONSTRUCTION
1	PAMAK 4A	50,000	195	1948	T/C-T/W	347 CLAD SS
2	Superior Linseed Oil	50,000	195	1948	T/C-T/W	347 CLAD SS
3	Unfiltered #1 Castor Oil	50,000	195	1948	T/W	347 CLAD SS
4	#1 FILTERED CASTOR	50,000	195	1948	T/W	CARBON STEEL
5	Unfiltered Extra Pale Castor Oil	50,000	195	1948	T/W	CARBON STEEL
6	Glycerine	20,000	96	1948	T/W	304 SS
7	SUNFLOWER FATTY ACID	13,000	54	1948	T/C-T/W	304 SS
8	O/R SOYBEAN	20,000	96	1948	T/C-T/W	CARBON STEEL
9	FUEL OIL	20,000	96	1948	T/W	CARBON STEEL
10	150 SOLVENT	20,000	96	1948	T/W	CARBON STEEL
11	XYLOL	20,000	96	1948	T/W	CARBON STEEL
12	EXEMPT. M.S.	20,000	96	1948	T/W	CARBON STEEL
13	O/R SOYBEAN	20,000	96	1948	T/W	CARBON STEEL
14	O/R SOYBEAN	20,000	96	1948	T/C-T/W	CARBON STEEL
15	KELLIN T-33	20,000	96	1948	T/C	CARBON STEEL
16	EXEMPT V.M.P.	20,000	96	1948	T/W	CARBON STEEL
17	UNFLT EXTRA PALE C/O	20,000	96	1948	T/W	CARBON STEEL
18	XYLOL	20,000	96	1948	T/W	CARBON STEEL
19	EXEMPT M.S.	20,000	96	1948	T/W	CARBON STEEL
20	RC 3553	20,000	96	1948	PLANT PRODUCT	CARBON STEEL
21	Pamolyn 200	13,000	54	1948	T/C-T/W	304 SS
22	NOT IN USE	13,000	54	1948	T/W	304 SS
23	O.M.S.	13,000	54	1948	T/W	CARBON STEEL
24	TOLUOL	13,000	54	1948	T/W	CARBON STEEL
25	Rec. Methanol	13,000	54	1948	FROM PLANT	CARBON STEEL
26	P5555-MO-45	13,000	54	1948	PLANT PRODUCT	CARBON STEEL
27	1241-M-60BV	13,000	54	1948	PLANT PRODUCT	CARBON STEEL
28	NOT IN USE	13,000	54	1948		CARBON STEEL
29	NOT IN USE	13,000	54	1948		CARBON STEEL
30	Ethyal Benzene	13,000	54	1948	T/W	CARBON STEEL
31	PHTHALIC ANHYDRIDE	29,500	273.54	1978	T/W	304 SS
32	NOT IN USE	13,000	54	1948		CARBON STEEL
33	NOT IN USE	13,000	54	1948		CARBON STEEL
111	BUTYL CELLOSOLVE	15,288	65		T/W	CARBON STEEL
112	Synethol Acids Recovered	14,218	59		PLANT BY-PRODUCT	ALUMINUM
113	SEC BUTYL ALCOHOL	5,900	49	1965	T/W	CARBON STEEL
114	Sec. Butanol	5,900	49	1965	T/W	CARBON STEEL
115	Ethanol	5,900	49	1965	T/W	CARBON STEEL
116	ETHANOL	5,900	49	1965	T/W	CARBON STEEL

REVISED DATA 5/29/85 AED

TANK INVENTORY-RAW MATERIALS-BETWEEN BLDGS. 4 & 25

NEWARK, NEW JERSEY-RESINS AND PLASTICS DATE ________

TANK NO.	PRODUCT	CAPACITY	GPI	TEMP.	MATERIAL RECD. BY	TANK CONSTRUCTION
127	NOT IN USE	15000	49			316 SS
128	TRIMETHYCOL PROPANE	15000	49		T/C-T/W	316 SS
129	NOT IN USE	15000	49			304 SS
130	NEOPENTYL GLYCOL 30-367	15000	49		T/W	304 SS
131	PROPYLENE GLYCOL 30-016	15000	49		T/W	CARBON STEEL
132	STYRENE 30100	15000	49		T/W	PLASTIC LINED CARBON STEEL
133	VINYL TOLUENE 30104	15000	49		T/C-T/W	PLASTIC LINED CARBON STEEL
134	VINYL TOLUENE 30104	15000	49		T/C-T/W	PLASTIC LINED CARBON STEEL
135	NOT IN USE	15000	49			CARBON STEEL
136	NOT IN USE	15000	49			PLASTIC LINED CARBON STEEL
76	NOT IN USE	20700	96			ALUMINUM
105	NOT IN USE	10283	54			STEEL
106	NOT IN USE	10283	54			STEEL
107	NOT IN USE	10283				STEEL
	No.2 Fuel Oil-NOT IN USE		Underground adjacent to boiler room			UNKNOWN
	No.2 Fuel Oil-NOT IN USE		Located adjacent to building 16			UNKNOWN
	No.2 Fuel Oil-NOT IN USE		Located adjacent to building 16			UNKNOWN
79	NOT IN USE	3000			3rd floor Bldg. 31	STEEL
300	NOT IN USE	259000			Diked area of yard	STEEL
309	NOT IN USE	47000			Diked area of yard	STEEL

0-100 Drums containing hazardous waste stored between tanks 300 and 302.
Several portable tanks containing hazardous waste stored between tanks 300 and 302.

ALL TANKS ARE 10FT DIAM. X 26FT HIGH

INSTALLATION DATE-----1975

945990088

FMT000166

Appendix 4

SPENCER KELLOGG - TEXTRON - NEWARK, NJ

HAZARDOUS MATERIALS STORAGE

MATERIAL	QUANTITY	LOCATION	STORAGE METHOD
Adipic Acid	4330 lbs	Bldg.32-5th Fl.	Bags
Ammonium Hydroxide	16,700 lbs	Bldg.32-1st Fl.	Drums
Benzoic Acid	12,694 lbs	Bldg.32-5th Fl.	Bags
Butyl Acetate	-	Bldg.32-4th Fl.	Drum
Formaloehyde (37%)	1370 lbs	Bldg.31-1st Fl.	Drum
Ethyl Benzene	25,523 lbs	Tank #30	Bulk
Maleic Anhyoride	27,600 lbs	Bldg.32-5th Fl.	Bags
Methyl Methacrylate	670 lbs	Bldg.32-5th Fl.	Drum
Mineral Spirits	60,377 lbs	Tanks #12 & 19	Bulk
Phospheric Acid (85%)	286 lbs	Bldg.31-4th Fl.	Drum
Sodium Hydroxide (Caustic)	~4,000 lbs	Bldg.32-5th Fl.	Drum
Sulfuric Acid	124 lbs	Bldg.31-4th Fl.	Drum
Toluene	34,139 lbs	Tank #24	Bulk
VM & P	86,279 lbs	Tank #16	Bulk
Xylene	63,707 lbs	Tanks #11 & 18	Bulk
Vinyl Toluene	62,584 lbs	Tanks #133 & 134	Bulk
#6 Fuel Oil	70,000 Gallons	Tanks #303 & 320	Bulk
Odorless Mineral Spirits	37,813 lbs	Tank #23	Bulk
Solvent 150	30,080 lbs	Tank #10	Bulk

0-100 Drums containing hazardous waste stored between tanks 300 and 302.

Several portable tanks containing hazardous waste stored between tanks 300 and 302.

All materials to remain on site because the business is being continued by the purchaser.

9

Appendix 5

Spencer Kellogg

ECRA Case #85403

Appendix 5

Description of Spill or Discharge

During the operation of the facility, the following spills or discharges are known to have occurred. Each area will be assessed during the sampling program either directly or indirectly.

1. On or about August 19, 1976, the sanitary sewer line ruptured. The material in the sewer line apparently drained into the underground flume and was discharged into Newark Bay. Approximately 20,000 pounds of caustic wash had been discharged into the sanitary sewer atounr this time, but the amount of material that actually leaked from the samitary sewer is unknown since the pipes are underground. At the time of the incident, the Coast Guard, USEPA, Passaic Valley Sewage Commission and Ashland Chemicals (through the Emergency Reporting System) were notified. An attempt was also made to notify NJDEP. No citations were issued, and a new sewer pipe was installed and approved by the City of Newark.

2. On June 29, 1977, an estimated 5 gallons or less of Pamak (96% vegetable oil and 4% resin) leaked onto the ground when a Pamak pump developed a leak in the mechanical seal. That night the condensate

jammed and water overflowed onto the ground. The water flowed through the spilled Pamak carrying it onto Celanese's property and into Newark Bay. The Coast Guard was present when the run-off was discovered. The National Response Center, NJDEP, USEPA, Passaic Valley Sewage Commission and Ashland Chemical were notified immediately. Ashland Chemical was fined $150 for the discharge. In the initial cleanup, an absorbent material was used and in the final cleanup about one foot of dirt was removed and replaced with new fill.

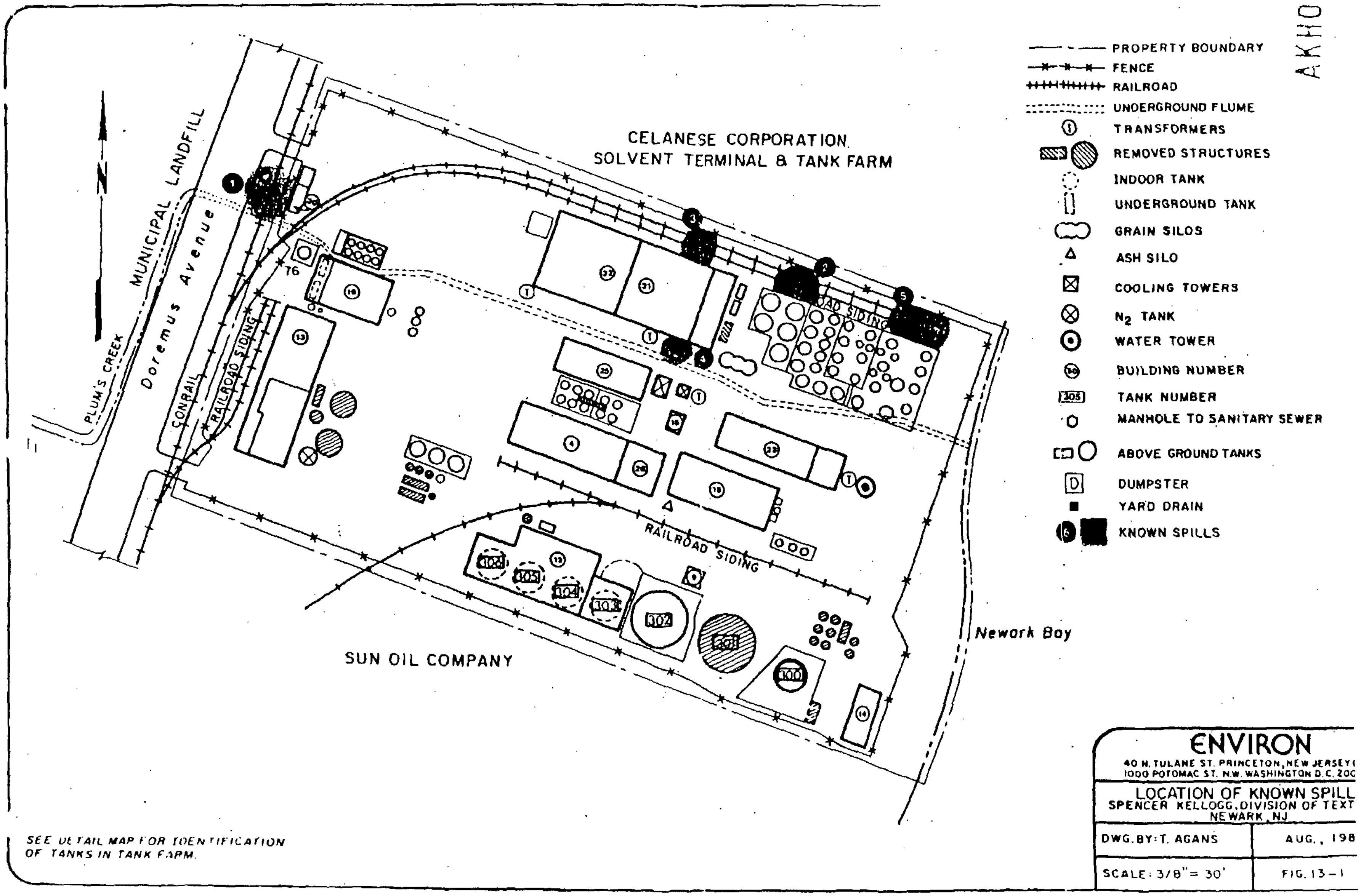
3. On July 12, 1978, about 75 gallons of a resin was spilled when the packing on the pump failed. Approximately 5 to 10 gallons of the resin reached Newark Bay. The resin, comprised mostly of 27 parts of Soya Oil and three parts of modifier, is nontoxic. The Coast Guard, NJDEP and Ashland Chemical were notified immediately. No fine was levied by the Coast Guard. The spill was cleaned up immediately using containment booms and vacuum trucks.

4. On September 10, 1979, an unknown amount of resin spilled from an overflowing tank into the yard where it flowed toward the yard drain. Some of it entered the underground flume and was discharged into Newark Bay. When the facility operators discovered the discharge, they notified the Goast Guard, the Passaic Valley Sewage Commission and Spencer Kellogg. The yard drain was then plugged with rags to prevent

further entry and the spill in the yard was cleaned up and covered with Speedi Dri. The Coast Guard fined Spencer Kellogg $50 for the discharge. A spill contractor was hired to do further cleanup.

5. Since the mid-1950s when the facility first began to use liquid phthalic anhydride, a few spills have occurred in the unloading area due to leaks in the pump seals and gaskets. In each instance, the phthalic anhydride which rapidly crystalizes at room temperature was broken up with jack hammers and pick-axes and removed. In some instances the area was then covered with gravel or stone.

AKH000085


CELANESE CORPORATION
SOLVENT TERMINAL & TANK FARM
MUNICIPAL LANDFILL
Doremus Avenue
PLUM'S CREEK
CONRAIL
RAILROAD SIDING
RAILROAD SIDING
SUN OIL COMPANY
Nework Bay
N
PROPERTY BOUNDARY
FENCE
RAILROAD
UNDERGROUND FLUME
TRANSFORMERS
REMOVED STRUCTURES
INDOOR TANK
UNDERGROUND TANK
GRAIN SILOS
ASH SILO
COOLING TOWERS
N_2 TANK
WATER TOWER
BUILDING NUMBER
TANK NUMBER
MANHOLE TO SANITARY SEWER
ABOVE GROUND TANKS
DUMPSTER
YARD DRAIN
KNOWN SPILLS
SEE DETAIL MAP FOR IDENTIFICATION OF TANKS IN TANK FARM.
ENVIRON
40 N. TULANE ST. PRINCETON, NEW JERSEY
1000 POTOMAC ST. N.W. WASHINGTON D.C. 20
LOCATION OF KNOWN SPILL
SPENCER KELLOGG, DIVISION OF TEXT
NEWARK, NJ
DWG. BY: T. AGANS
AUG., 198
SCALE: 3/8" = 30'
FIG. 13-1

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201 / 589-3709

June 25, 1982

Mr. W. Nedick
State of New Jersey
Department of Environmental
Protection
Division of Waste Management
120 Route 156
Yardville, New Jersey 08620

Dear Mr. Nedick:

We wish to respond to your letter of June 15, 1982 regarding our proposed DPCC/DCR plan for our facility as follows:

A. We would propose to institute a schedule of operation for use of our storm drain cover devices as follows:

1. All yard storm drains located in areas where hazardous materials are stored and/or transferred will have a cover device installed in place at all times. Cover devices would be removed to allow for drainage of accumulated storm water and would be reinstalled when storm water drainage is completed.

   There would be one (1) exception to the above and that would be a drain located adjacent to our truck scale. The installation of a device in this area would render our truck scale inoperative. For that particular storm drain we would propose to have a cover device available in the immediate area at all times.. In the event that a spill would occur in that area, the cover device would be installed immediately over the storm drain. We would provide proper training and written instructions to our supervisors and other employees as to the procedures for doing this and the urgency that it would require. We hope that you will find this to be a satisfactory schedule of operation for our cover devices.

B. I am attaching a copy of our letter to Mr. Stoop regarding our proposed plan for compliance of our fuel oil storage tank. This letter was directed to Mr. Stoop as a result of my conversation with you on June 24, 1982.

We hope you will find these proposals acceptable and if you desire any further information please contact me.

Arthur E. Dieffenbach

Arthur E. Dieffenbach,
Senior Process Engineer

:mf

DEFICIENCIES NOTED IN DPCC PLAN
SPENCER KELLOGG
NEWARK, N.J.

Enclosure:

7:1E-4.3(a)3	The name and address of the registered agent was not included in the plan.
7:1E-4.4(b)	Information concerning the completion date (month and year) of the proposed diking around the facility was not included in the plan.
7:1E-4.7(b)1	A statement to the permeability of the diked areas around the storage tanks when compared to the estimated time to remove the largest spill inside the dikes was not included in the plan.
7:1E-4.7(c)2	The capacity of the containment areas around the storage tanks and the tank truck loading areas was not addressed in the plan.
7:1E-4.7(c)4	The manner in which discharged hazardous substances will be prevented from entering the Newark Bay via the storm sewer lines was not addressed in the plan. Specific areas include the drainage from the bulk warehouse and the tank truck loading areas.
7:1E-4.7(c)6	The compatibility of materials stored within the same containment areas was not included in the plan.
7:1E-4.7(c)7	The estimated time to remove the largest probable spill from each of the containment areas was not included in the plan.
7:1E-4.8(a)	The types of containers used to store or process hazardous substances was not included in the plan.
7:1E-4.8(f)	The availability of and location of safety equipment used by personnel involved in the clean-up of spills was not included in the plan.
7:1E-4.9	Since spills from storage tanks have occurred in the past, the condition of the ground water should be determined by installing observation wells as outlined in this section.
7:1E-4.12(b)	Information concerning the designated person with the authority to act was not included in the plan.

DEFICIENCIES NOTED IN DPCC PLAN
SPENCER KELLOGG
NEWARK, N.J.

Enclosure:
Page 2

7:1E-4.14(a)1	Bulk storage tanks Number 105, 106, 107 and 315 do not appear to be provided with an adequate means of secondary containment.
7:1E-4.14(a)4	The location of valves on the above-ground tanks was not addressed in the plan.
7:1E-4.14(a)5	The schedule for testing the above-ground tanks was not included in the plan.
7:1E-4.14(b)	The presence of buried bulk storage tanks was not included in the plan.
7:1E-4.14(d)	The manner in which the discharge from internal heating coils is designed to prevent a discharge was not included in the plan.
7:1E-4.15(a)	The containment systems present around each of the tank car and tank truck loading areas was not included in the plan.
7:1E-4.15(c)	The presence of or lack of paving or surfacing in the tank car and tank truck loading areas was not included in the plan.
7:1E-4.16	The type of secondary containment around the drum storage area was not included in the plan.

NOTE: As per our telephone conversation, the DPCC Plan should be written following the same format as the regulations.

If you wish to make any inquiries concerning this DPCC Plan, you may contact Mr. Scott McCone at the above address or at (609) 292-5560.

Very truly yours,

Thomas Leonard
Supervisor of Engineering Review Section
Office of Hazardous Substances Control

TL:SMc:jdm

Enclosure: Deficiencies Noted in DPCC Plan

11

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

April 21, 1982

Bureau of Prevention and Planning
Division of Hazard Management
New Jersey Department Enviromental Protection
120 Route 156
Yardville, New Jersey 08620

Dear Mr. Nedick:

In response to your letter of April 5, 1982, we wish to indicate to you that the letter of October 14, 1980 from your department to Spencer Kellogg was never received by us. However, we wish to respond to the letter of October 14, 1980 as follows:

1. Name and Location of Facility
   Spencer Kellogg Div. of Textron Inc.
   Newark Resin Plant
   390-400 Doremus Avenue
   Newark, New Jersey 07105

2. Name of Owner and Operator of Facility
   Spencer Kellogg Div. of Textron Inc.
   P. O. Box 807
   Buffalo, New York 14240

3. Owner's Registered Agent
   Corporation Trust Co.
   28 West State Street
   Trenton, New Jersey 08608

4. Storage and Transfer Capacity of Facility
   Storage - 1,450,000 gallons
   Transfer - 60,000 gallons per day

5 & 6 Hazardous substances stored and transferred and average daily thruput.

SUBSTANCE	THROUGH PUT
Adipic Acid	580 lb/day
Ammonia (30%)	422 lb/day
Benzoic Acid	205 lb/day
Formaldehyde (37%)	130 lb/day
Maleic Anhydride	1069 lb/day
Methyl Methacrylate	80 lb/day
Phosphoric Acid	5 lb/day
Sodium Hydroxide	672 lb/day
Styrene	980 lb/day
Sulfuric Acid	5 lb/day
Toluol	2456 lb/day
Xylol	11,823 lb/day
Fuel Oil	3775 gallons/day
150 Solvent	881 lb/day
Mineral Spirits	11357 lb/day
High Flash Naptha	2528 lb/day
Odorless Mineral Spirits	2586 lb/day
140 Solvent	684 lb/day
Triethyl Amine	102 lb/day
Vinyl Toluene	634 lb/day
Dicyclo Pentadiene	556 lb/day

All of the above average daily throughput figures were calculated from actual plant usage for first quarter of 1982 except for fuel oil. Fuel oil throughput was calculated from actual usage during calendar year of 1981.

If you require any additional information regarding this matter please call me at 201-589-3709.

Arthur Dieffenbach

Arthur Dieffenbach
Sr. Process Engineer

:mf
cc: J. F. Brooks
M. Smith
M. J. Soderberg

945990105

3

12

Exhibit 5

ENVIRON

December 16, 1991

HAND DELIVERY

Mr. Sal Balakrishnan
BEECRA Cleanup Oversight Section
New Jersey Department of
Environmental Protection and Energy
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Balakrishnan:

Enclosed please find the progress report describing the activities associated with implementation of the Cleanup Plan at the former Spencer Kellogg facility for November 1991. Also included in this report are responses to several issues raised in your October 31, 1991 letter to Textron.

Please contact us if you have any questions or need further information.

Sincerely,

Scott E. MacDonald
Manager

Julia L. Mermelstein
Senior Associate

SEM/JM:dmd
0288E:PAA01F80.W51

Enclosures
cc: J. Schiavone
R. Lawrence

945990108

CLEANUP PLAN IMPLEMENTATION
PROGRESS REPORT

Textron Inc. - Former Spencer Kellogg Facility
ECRA Case No. 85403

November 1991

1. Activities Performed This Reporting Period

The activities performed during this reporting period include: (1) continued discussions with Reichhold personnel regarding site coordination issues; (2) final modifications to the low temperature thermal aeration (LTTA) unit and initial trial testing; (3) temporary cessation of excavation activities beneath Building 4 (AEC 12); (4) site preparation activities, including railroad track removal; (5) excavation and post-excavation sampling in various AECs; (6) off-site disposal of several waste streams; and (7) activities related to the observation of free-phase material in AEC 3.

Site Coordination Issues

On November 7, 14, and 21, 1991, representatives of ENVIRON, Canonie, and Reichhold met at the site to discuss ongoing site coordination issues, including access to particular areas of the site and alternative piping requirements for feedstock delivery to the large tank farm during remediation of AEC 7. The pipe relocation system for AEC 7 was constructed and tested during November 1991. The new piping system will be tied into the existing lines in December 1991 prior to initiation of remedial activities in this area.

Final Modifications to the LTTA Unit and Initial Trial Run

As indicated in the November 15, 1991 progress report to NJDEPE, Canonie made final connections of all LTTA system components during October 1991. Final modifications to the system's quench tower, including installation of a new booster pump and piping, were made during this reporting period to increase the flow rate in the quench tower, thus completing the setup of the LTTA system.

Canonie conducted the initial trial run of the LTTA unit on November 26, 1991. Approximately 120 tons of excavated soil from AECs 3, 4 and 5 were processed during the six-hour test. Preliminary analytical results of hourly post-treatment samples indicated levels of toluene, ethylbenzene and xylene significantly below 10 ppm and levels of benzene at or below 1 ppm. The presence of benzene in these samples was not expected since this compound was not previously detected at the site. The occurrence of benzene in the post-treatment sampling results will continue to be evaluated during the trial testing period. Laboratory error may account for some portion of the benzene results. Final results from post-treatment sampling of this and other trial runs to be conducted in early December will be discussed and presented in the progress report for December 1991. As previously discussed with S. Balakrishnan of NJDEPE, all analytical data generated during remediation, as well as applicable Quality Assurance/Quality Control (QA/QC) documentation, will be submitted with the final report documenting the results of site cleanup.

Remedial Activities Beneath Building 4 (AEC 12)

As indicated in the November 15, 1991 progress report, approximately 40% of AEC 12 had been excavated as of October 31, 1991. Textron elected to dispose of the resinous materials removed from beneath Building 4 (AEC 12) as New Jersey hazardous waste (C433) at Chemical Waste Management's landfill in Model City, New York. During November 1991, additional excavation activities were temporarily suspended pending final approval from the Model City facility for disposal of these materials. Limitations regarding staging areas for roll-off containers on-site precluded the generation of additional materials for off-site disposal. On November 13, 1991, seven rolloffs of resinous material (including resin from AEC 19) were sent to Chemical Waste Management's landfill in Model City, New York. Canonie also pumped approximately 20,000 gallons of water from AEC 12 that was ultimately disposed of at Chemical Waste Management's water treatment facility in Newark, New Jersey as non-hazardous wastewater.

In addition, high tides on October 30 and 31, 1991 resulted in flooding at the site, including the filling of the excavation beneath Building 4 (AEC 12) with approximately 25,000 gallons of water. Excavation in this AEC could not be resumed until the stormwater was removed. The stormwater from the excavation was treated on-site using activated carbon prior to being discharged to the Passaic Valley Sewerage Authority (in accordance with appropriate approval). Excavation in AEC 12 resumed on December 10, 1991.

Site Preparation Activities in AECs 3, 4, 5, 16, 19, and 25

During this reporting period, Canonie removed the railroad tracks in AECs 3, 4, 5, 16, and 25, removed the northern and western sides of the retaining wall surrounding AEC 19 to facilitate equipment access, and removed dried, resinous materials from the ground surface in AEC 19. Disposal of these materials is discussed in the section of this progress report entitled "Off-Site Waste Disposal."

Excavation Activities and Post-Excavation Sampling

During November 1991, Canonie excavated a "hot spot" area in AEC 3, excavated AECs 23 and 28 for base/neutral compounds (BNs) and performed additional excavations in AECs 3, 4, 5 and 9 to address volatile organic compounds (VOCs). Relevant excavation activities and post-excavation sampling are discussed below. The locations of most of the post-excavation samples are shown on Figure 5 of the May 1991 Work Plan, although a number of additional sampling locations described below were not proposed in the May 1991 Work Plan. A complete list of samples collected during November 1991, as well as drawings showing the locations of samples not proposed in the May 1991 Work Plan, are provided as Attachment 1 to this progress report. The available analytical results for samples collected during November 1991 are provided as Attachment 2 to this progress report.

a) BN Areas

As proposed in the May 1991 Work Plan, Canonie excavated an area within AEC 3 and all of AECs 23 and 28 due to the presence of BNs above site-specific cleanup criteria. Post-excavation samples were subsequently collected from sampling locations P-5 and P-6 along the western and eastern sidewalls of the excavation in AEC 3, from sampling locations P-35 and P-36 along the western and eastern sidewalls of the excavation in AEC 23, and from sampling locations P-17 and P-18 along the western and eastern sidewalls of the excavation in AEC 28. These sample locations are shown on Figure 5 of the May 1991 Work Plan. The soil samples obtained from each of the referenced locations were collected from a depth of 1.5 feet below ground surface and analyzed for BN+15 using EPA Method 8270. The specific results of this sampling are discussed below.

AEC 3

The sample results from P-5 and P-6 indicated levels of carcinogenic polycyclic aromatic hydrocarbons (CaPAHs) and total BNs above site-specific cleanup criteria. To ensure that all BNs within this area were appropriately remediated, Canonie extended the excavation approximately 10 feet in both the western and eastern directions and collected additional post-excavation samples along new western and eastern sidewalls (samples P-5A and P-6A) from a depth of 1.5 feet below ground surface. The analytical results from both of these additional samples exceeded the site-specific action level for CaPAHs, and the sample from P-6A also exceeded the site-specific action level for total BNs. To further evaluate the extent of CaPAHs within AEC 3, Canonie collected two additional samples at 10 foot intervals west and east of P-5A and P-6A, respectively. These sample locations are identified as P-5B, P-5C, P-6B, and P-6C. The analytical results for these additional samples were below site-specific action levels for CaPAHs and total BNs. Therefore, the extent of these compounds within AEC 3 has been fully delineated. The excavation in this area will be extended to clean sample locations P-5B and P-6B and no further post-excavation sampling will be conducted.

AEC 23

The analytical results for samples P-35 and P-36 were below the site-specific action level for CaPAHs, and the sample result from P-36 was also below the site-specific action level for total BNs. The sample from P-35, however, exceeded the site-specific action level for total BNs due to the presence of high concentrations

(1,700 ppm) of bis(2-ethylhexyl) phthalate. Because the presence of this compound is atypical for this site and the results, in part, could be indicative of plastic contamination introduced during sampling and/or analysis, Canonie collected an additional sample adjacent to previous location P-35 (sample P-35A) to confirm the presence of this compound. The analytical results for this additional sample were below the site-specific action levels for both CaPAHs and total BNs (Bis[2-ethylhexyl] phthalate was detected at 0.17 ppm). Although the results of the confirmatory sample do not indicate unacceptable BN levels along the sidewall, Canonie will extend the excavation to the east a minimum of one foot and collect one additional sidewall sample ~~to confirm that the BN contamination in this area has been~~ adequately addressed.

AEC 28

Samples were collected from locations P-17 and P-18, along the eastern and western sidewalls of the excavation in AEC 28. The analytical results for these samples are expected in December 1991 and will be included with the progress report for that period.

b) VOC Areas

As proposed in the May 1991 Work Plan, Canonie excavated soils in AECs 3, 4, 5 and 9, all of which are being remediated for VOCs (with the exception of the BN "hot spot" in AEC 3 described above that is being remediated for both BNs and VOCs). Relevant excavation activities and post-excavation sampling in each of these AECs are described below. All post-excavation soil samples were collected at a depth of 1.5 feet below ground surface and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020.

AECs 3, 4, and 5

To maintain the physical integrity of the northern retaining wall along AECs 3, 4 and 5, soils were excavated to within one foot of the wall. As required by NJDEPE's October 31, 1991 letter, post-excavation samples were subsequently collected at 30-foot intervals along the exposed sidewall in these areas. Preliminary analytical results for a number of these samples exceeded the site-specific cleanup criteria for the target VOCs. As a result, Canonie collected additional samples approximately one foot deeper within the sidewalls at those former sampling locations (at the same depth below ground surface) containing VOCs in excess of the cleanup criteria. The analytical results for these additional samples, however, have not yet been received. All verified analytical data from this area will be provided and discussed with the progress report for December 1991.

Canonie collected additional post-excavation samples along the southern borders of AECs 4 and 5 (beneath the tank farm wall) because approximately 8 to 12 inches of soil were exposed during low tide conditions. It is currently believed, however, that these soils samples may have been collected from a zone which is below the ground water level at high tide. The preliminary analytical results for a number of these samples exceeded the site-specific cleanup criteria for target VOCs. Canonie subsequently collected additional samples approximately 1.5 feet further into the sidewalls at these former sampling locations (at the same elevation) containing VOCs in exceedance of the cleanup criteria. The analytical results have not yet been received. All verified data will be provided and discussed with the progress report for December 1991. A proposal for further action, if any, in this area will be made following the receipt of the additional analytical results and the determination of the actual high tide conditions in AECs 4 and 5.

No samples were collected along the southern border of AEC 3 (along the loading dock wall) because the building's foundation extends several feet below the water table.

Three additional samples (P-64, P-65, and P-66) not proposed in the May 1991 Work Plan were collected in the southeastern portion of AEC 5, which contains a pump pad, loading rack, and stairway pad (hereinafter referred to as the "loading rack area"). Soil excavation in this area could not be conducted under the structures in this area and could not be extended to the tank farm wall due to access problems and concerns about maintaining the physical integrity of these features. The analytical results for all three samples were below the site-specific action levels for target VOCs. Therefore, no further excavation of soils or remedial action will be undertaken in the loading rack area.

Samples were also collected from locations P-9, along the eastern border of AEC 5, and P-10, between Building 31/32 and the tank farm. The analytical results for the sample from P-9 were below site-specific action levels for target VOCs. Therefore, the extent of the excavation along the eastern border of AEC 5 has been fully delineated. The analytical results for the sample from P-10 exceeded the site-specific action levels for VOCs. The excavation in that area will be extended and an additional post-excavation sample will be collected. The specific results for these samples will be provided with other data from AECs 3, 4, and 5 in the progress report for December 1991.

AEC 9

As proposed in the May 1991 Work Plan, Canonie excavated the area within AEC 9 (beneath Building 16) as shown on Figure 5 of the May 1991 Work Plan. In response to NJDEPE's February 8, 1991 conditional approval letter, the post-excavation sample (P-21) from this area was analyzed for both BTEX and BN compounds. The analytical results for this sample were below the site-specific action levels. Therefore, no further action is required in this AEC.

Activities Related to the Observation of Free-Phase Material in AEC 3

Subsequent to completion of excavation activities in AEC 3, a thin layer of free-phase resinous material was discovered on the ground water in the bottom of the AEC 3 excavation. This material appears to have originated from under the current production building south of AEC 3. A period of heavy rainfall also contributed to the release of a small amount (something less than 5 gallons) of this material to Newark Bay. This material was immediately contained by collection booms. As you know, both the initial observation and the release to Newark Bay were reported to NJDEPE in the manner provided in N.J.A.C. 7:1E-5.3 required under applicable regulations. A final spill report is being prepared by Textron and will be provided to the agency on December 20, 1991.

In response to the observation of free-phase material in AEC 3, gravel-filled trenches have been installed along the loading dock of Building 31/32 in areas where a thin layer of product was observed. These trenches will serve to collect and contain this material. Two vertical stand-pipes have also been installed through the gravel in the trench so that recovery of the free-phase material can be facilitated. ENVIRON is currently working with Reichhold personnel to review structural drawings and to obtain access to areas beneath the building to better understand the potential extent and source(s) of this material. Textron will report to NJDEPE in future progress reports any information with regard to the source(s) of the material as well as any actions taken to address these sources. Textron reserves all rights and defenses with regard to its responsibilities, if any, for remediating these sources.

Off-Site Waste Disposal

The following disposal activities took place during November 1991: approximately 220 cubic yards (11 rolloffs) of asphalt from various AECs were sent for recycling to Clayton Block in Lakewood, New Jersey; approximately 55 cubic yards (5 rolloffs) of concrete from AEC 19 were sent for recycling to Clayton Block in Lakewood, New Jersey; approximately 140 cubic yards (7 rolloffs) of excavated resin from AECs 12 and 19 were sent to Chemical Waste Management's landfill in Model City, New York; and approximately 20,000 gallons of water from excavated resin in AEC 12 were sent to Chemical Waste Management's water treatment facility in Newark, New Jersey.

As described in the November 15, 1991 progress report, Textron intends to dispose of miscellaneous debris generated during remediation as non-hazardous waste. During November 1991, Canonie prepared an application for classification of this waste as ID-13, and submitted it to Mr. Richard Johnson of NJDEPE's Division of Hazardous Waste Management on December 3, 1991.

2. Data Produced in November 1991

As discussed above, Canonie collected post-excavation samples for BN analysis in AECs 3, 9, 23, and 28 and for VOC analysis in AECs 3, 4, 5, and 9 during November 1991. The available analytical results of this sampling are provided as an attachment to this progress report.

3. Modifications to the October 1990 Cleanup Plan

AEC 4

In the October 1990 Cleanup Plan, ENVIRON indicated that the surficial soils in AEC 4 contained resinous materials that would not be suitable for low temperature thermal treatment, but would be scraped away and transported off-site for disposal at an appropriate disposal facility. During November 1991, however, Canonie determined that the dried, resinous material can be processed in the LTTA unit. Therefore, both the resinous surface materials and the soils excavated from this area will be processed on-site.

AEC 5

As discussed above, Canonie determined that the southeastern portion of AEC 5 (the loading rack area) could not be excavated to the tank farm wall (as indicated in the October 1990 Cleanup Plan) due to the presence of a pump pad, loading rack, and stairway pad which rest on shallow foundations. As described in Section 1 of this progress report, post-excavation samples were collected in this area, and the analytical results were below the site-specific action levels for VOCs. As a result, no further excavation of soils is planned for this section of AEC 5.

Project Schedule

An updated project schedule based upon current projections is provided as Attachment 3 to this progress report. This project schedule represents planned activities (i.e., desirable start and completion dates) and is not intended to establish firm deadlines. At the time of the submittal of the November 15, 1991 progress report, it was anticipated that the completion of soil processing and preparation of the Final Report would take place within approximately the dates projected in the October 1990 Cleanup Plan. However, based on the results of the LTTA trial run, the actual throughput rate of the unit is expected to be 15 tons per hour (tph) rather than the 30 tph rate on which the previous completion date was based. The current project schedule anticipates completion of soil processing and preparation of the Final Report by April 1, 1992. Textron will notify NJDEPE of any additional modifications to the project schedule in future progress reports.

4. Remedial Costs and Percent of Total Remedial Activities to Date

Costs for remediation activities through November 1991 total approximately $725,000. This cost includes Canonie's activities related to obtaining permits, mobilizing to the site, removing asphalt, excavation in several AECs, and initial testing of the LTTA unit. Approximately 36% of all remedial activities has been completed. Therefore, the projected costs to completion appear to be within the amounts estimated for purposes of financial assurance.

5. Information Requested in NJDEPE's October 31, 1991 Letter

In its October 31, 1991 letter, NJDEPE requested that responses to a number of issues be submitted with the monthly progress report due December 15, 1991. These issues included (1) the locations where field instrument measurements to monitor air quality will be taken, and (2) acknowledgement of the requirements related to asbestos concerns. In addition, the letter requests that NJDEPE be notified at least 14 days prior to the initiation of any sampling and/or cleanup activity at the site. These items are discussed below.

Air Quality Monitoring

In its October 31, 1991 letter, NJDEPE states that "the [May 1991 Work Plan's] air emissions contingency plan (section 5.7) does not specify the locations where field instrument measurements to determine potential exceedances of applicable air quality standards will be taken," and requests clarification. The clarification requested is provided below.

During remediation, Canonie has been and will continue to take field measurements of air quality at the following locations: (1) downwind of excavations in progress; (2) downwind of the screen-all unit where oversized debris is separated from material to be processed in the LTTA unit; (3) downwind of the contaminated soil feed hopper which holds soils prior to treatment; and (4) downwind of the contaminated soil stockpile while it is uncovered during the day for processing.

Asbestos Concerns

In its October 31, 1991 letter, NJDEPE states that "all friable and/or deteriorated ACMs shall either be properly encapsulated or removed in accordance with all applicable state, federal and local guidelines." In response to this requirement, Textron has asked ENVIRON to conduct an asbestos survey at the facility. This survey will include visual inspection of suspected asbestos containing materials (ACMs) and sampling of friable and damaged materials to confirm the presence and amount of ACMs that may require remediation. The results of this survey will be provided to NJDEPE in a subsequent progress report.

Textron is seeking the cooperation of NL Industries, Inc. (NL) in conducting the survey. However, by conducting the survey, Textron is not accepting responsibility for any ACMs that may be discovered at the facility and is reserving all rights it may have against any and all parties with respect to ACMs at the former Spencer Kellogg facility.

Notification Requirement

NJDEPE's October 31, 1991 letter stated that "Textron shall notify this Bureau at least 14 days prior to the initiation of any sampling and/or cleanup activity at the site." At the time Textron received the letter, cleanup activities and sampling activities had already been conducted at the site. Moreover, Textron did notify NJDEPE, both orally and in earlier progress reports, of the schedule for initiating cleanup and sampling activities, and has continually provided NJDEPE with detailed schedules of all remedial activities. Due to the need for day-to-day flexibility in cleanup implementation, however, it is not possible to provide 14 days notice prior to initiation of each remediation action or round of soil samples. These activities are expected to be conducted on a daily basis throughout the remainder of the cleanup. Therefore, Textron will continue to provide NJDEPE with updated schedules which outline proposed start and completion dates for all planned tasks.

6. Activities Scheduled for December 1991

Activities for December 1991 primarily will include: (1) completion of the LTTA trial runs; (2) commencement of full-scale soil processing, including approximately 1200 tons of soil from AECs 3, 4, 5 and 16; (3) completion of the excavation of AEC 3 and backfilling of the excavation with clean fill material; (4) restoration of the railroad tracks in AEC 3, 4 and 5; (5) installation of an additional gravel trench in an apparent source location along the Building 31/32 loading dock; (6) completion of the installation of temporary piping adjacent to AEC 7; (7) excavation of AEC 16; (8) resumption of the AEC 12 resin excavation and off-site disposal; and (9) initiation of asbestos survey.

0288E:PAA01F80.W51

13

DEED

THIS DEED OF CONVEYANCE, made and entered into this 11th day of December, 1978, by and between ASHLAND OIL, INC., formerly known as Ashland Oil & Refining Company, a Kentucky corporation, with offices at 5200 Paul G. Blazer Memorial Parkway, Dublin, Ohio 43017 (hereinafter called ("GRANTOR") and TEXTRON, INC., a Delaware corporation with its principal place of business at 40 Westminster Street, Providence, Rhode Island 02903, (hereinafter called "Grantee").

WITNESSETH:

That for and in consideration of $1,500,000 cash in hand this day paid, ~~and other good and valuable consideration as set forth in that certain Purchase Agreement dated November 15, 1978 between GRANTOR and GRANTEE,~~ the receipt and adequacy of all of which is hereby acknowledged, GRANTOR has granted, bargained, sold and conveyed, and does by these presents grant, bargain, sell and convey unto GRANTEE, its successors and assigns forever, those certain four (4) parcels of land, together with all improvements located thereon, described in Exhibit A, which is attached hereto and made a part hereof (hereinafter sometimes called the "Premises"). The Premises are Lots 9 and 9A and 11 and 11A in Block No. 5070 in Newark, Essex County, New Jersey.

TO HAVE AND TO HOLD the Premises with rights and appurtenances thereunto belonging to GRANTEE, its successors and assigns forever.

This conveyance is made subject to applicable zoning laws, ordinances, regulations and restrictions and to all easements, rights of way, exceptions, reservations, restrictions and conditions contained in prior instruments of record in the chain of title to the Premises described in Exhibit A.

COUNTY OF ESSEX
CONSIDERATION 1,500,000
REALTY TRANSFER FEE 5,250.00
DATE

REGISTER
AKH000290
DEC 18 12 23 PM '78
ESSEX COUNTY, N.J.

945990122

EXHIBIT A

LEGAL DESCRIPTION OF REAL ESTATE TO BE CONVEYED TOGETHER WITH A LIST OF ANY APPLICABLE LIENS, CHARGES OR ENCUMBRANCES.

Property 1 - Newark, N.J.

All those certain lots, pieces or parcels of land lying and being in the City of Newark, in Essex County, New Jersey, and being more particularly bounded and described as follows:

PARCEL I

Beginning at a point on the westerly bank of the Passaic River, where the division line between the premises herein described and the land formerly of the Federal Real Estate Company [now of Ashland Oil, Inc. ("AOI")] intersects the said River; running thence along the northerly line of the land of AOI, and hereinafter described as PARCEL II, north 55 degrees 26 minutes west 762 feet to the easterly line of the land conveyed by John C. Ahrens and Elizabeth, his wife, to Bay Shore Connecting Railroad Company, by deed dated March 21, 1907, and recorded April 12, 1907, in L. Q-41 c.p. 364; running thence along the easterly line of the property of the Bay Shore Connecting Railroad Company north 32 degrees 35 minutes east 248.38 feet to the southerly line of the land now or formerly of The Texas Company; running thence along southerly line of the land now or formerly of The Texas Company south 55 degrees 59 minutes east 681.45 feet to the westerly bank of the Passaic River; and running thence southerly along the westerly bank of said River to the point or place of beginning.

PARCEL II "A"

Beginning at a point in the westerly high water line of the Passaic River, where the same is intersected by the division lines between lands formerly of Organic Salt & Acid Company, Inc. (now the property of AOI) and being the courses first described in PARCEL 1 above; thence along said division line north 63 degrees 38 minutes west 774 feet to the easterly line of lands of the Bay Shore Connecting Railroad Company; thence along said last mentioned line south 24 degrees 21 minutes west 238.80 feet to the northerly line of lands now or formerly of Ballard Oil Equipment Company; thence along said last mentioned line south 63 degrees 38 minutes east 853 feet to the said high water line of the Passaic River; thence along said high water line of the Passaic River north 6 degrees 15 minutes east 254.15 feet to the beginning. The above description being in accordance with a survey made by George H. Gardner, Surveyor, dated February 16, 1925.

PARCEL II
"B"

Beginning at a point in the high water line of the northwesterly shore of the Passaic River, where the same is intersected by the southerly line of subdivision "A" of PARCEL II; thence southeasterly 75 feet to and at right angles with the exterior wharf line established by the Commissioners appointed under the authority of the act entitled "An Act to Ascertain the Rights of the State and of Riparian Owners in the Lands Lying under the Waters of the Bay of New York and Elsewhere in this State", approved April 11, 1864, and the supplements thereto; thence northeasterly along said exterior wharf line as shown and located on the map annexed to the grant from Edward C. Stokes, Governor, and others, Riparian Commissioners, to Federal Real Estate Company, recorded in Deed Book R 42, Page 561, et seq. 254 feet; thence northwesterly at right angles with said exterior wharf line 75 feet to the high water line of the northwesterly shore of the Passaic River where the same is intersected by the southerly line of the property described as PARCEL I herein; thence southwesterly along the high water mark to the place of beginning.

PARCEL II
"C"

Beginning in the exterior wharf line as called for in the grant made by the State of New Jersey on October 24, 1907, to Federal Real Estate Company, where the same is intersected by the southerly line of said grant;

Thence (1) south 83 degrees 42 minutes east along the extension of the southerly line of said grant and binding upon the grant made by the State of New Jersey July 18, 1927, to Ballard Oil Equipment Company, Inc., thirty-two and eleven hundredths (32.11) feet to the Pierhead and Bulkhead Line approved May 10,

AKH000292

4008 ... 773

945990124

1915 by the Assistant Secretary of War and adopted August 3, 1915 by the Board of Commerce and Navigation appointed under the authority of the act entitled "An Act creating a department to be known as the Board of Commerce and Navigation, and vesting therein all the powers and duties now devolved, by law, upon the Board of Riparian Commissioners, the Department of Inland Waterways, the Inspectors of Power Vessels, and the New Jersey Harbor Commission", approved April 8, 1915, and other acts and joint resolutions of the Legislature of said State;

Thence (2) north 10 degrees 25 minutes east following said Pierhead and Bulkhead Line two hundred fifty-five and ninety hundredths (255.90) feet to a point;

Thence (3) north 83 degrees 42 minutes west in line with the northerly line of grant made by the State of New Jersey to Federal Real Estate Company aforesaid, fifty-three and forty-two hundredths (53.42) feet to the Exterior Line as called for in the aforesaid grant;

Thence (4) southwardly following said Exterior Wharf Line two hundred and fifty-four (254) feet to the place of beginning.

Together with all right, title and interest of AOI in and to the Wharf of the Passaic River in front of the premises described as PARCEL I and all riparian rights of the said AOI in and to any land lying in the bed of said Passaic River lying in front of said PARCEL I.

Together with a right of way for ingress and egress to and from Doremus Avenue to the premises described as PARCEL I and PARCEL II, Subdivision "A", over the right of way of the Bay Shore Connecting Railroad Company as reserved in the deed to the Bay Shore Connecting Railroad Company by deed from John C. Ahrens and Elizabeth his wife, dated March 21, 1907, and recorded April 12, 1907, in Liber Q41, c.p. 364.

PARCEL III

Beginning at a point in the mean high water line of the westerly shore of the Passaic River where the same is intersected by the northerly boundary of lands formerly of the

Federal Real Estate Company (now of AOI) said point being distant 762 feet measured south 55 degrees 26 minutes east along said northerly boundary from its intersection with the easterly line of Bay Shore Connecting Railroad;

Thence (1) north 14 degrees 56 minutes east crossing the mouth of Plums Creek a distance of 270.46 feet to a point in the mean high water line of the westerly shore of Passaic River where the same is intersected by the division line between lands now or formerly of The Texas Company and lands of AOI, said point being distant south 55 degrees, 59 minutes east 681.45 feet eastwardly from the easterly line of the Bay Shore Connecting Railroad measured along said division line.

Thence (2) in a general southwestwardly, northwestwardly, southeastwardly and southwestwardly direction following said mean high water line of Passaic River and Plums Creek, the various courses and distances thereof to the point and place of beginning.

It being understood, however, that nothing contained in this grant shall constitute a right to close up or divert Plums Creek to the detriment of the owners of land through which said creek runs or to interfere with the natural uses of said creek for drainage purposes.

PARCEL IV

Beginning at a point in the former mean high water line of the westerly shore of Passaic River where the same is intersected by the boundary line between lands formerly of Federal Real Estate Company and lands of AOI herein, said point being distant 762 feet on a course which bears south 63 degrees 37 minutes 10 seconds east from the Southeasterly line of the Bay Shore Connecting Railroad, measured along the aforesaid boundary line, said point being also described as the beginning point in PARCEL I, in the deed from U.S. Industrial Alcohol Co., to U.S. Industrial Chemicals, Inc. dated December 31, 1938;

Thence (1) south 63 degrees 37 minutes 10 seconds east along the extension of said boundary line a distance of 12 feet to a point;

Thence (2) south 83 degrees 42 minutes east bounding upon the northerly line of lands granted by the State of New Jersey to Federal Real Estate Company, October 27, 1907, and lands granted to U.S. Industrial Alcohol Co., July 15, 1929, a distance of 124.99 feet to the Pierhead and Bulkhead Line approved May 10, 1915 by the Secretary of War (re-approved June 27, 1925 by the Acting Secretary of War);

Thence (3) north 10 degrees 25 minutes east following said Pierhead and Bulkhead Line a distance of 272.26 feet to a point;

Thence (4) north 82 degrees 03 minutes 34 seconds west bounding upon the southerly line of lands granted by the State of New Jersey to The Texas Company, January 16, 1928, a distance of 157.90 feet to a point in the former mean high water line of the westerly shore of Passaic River where the same is intersected by the boundary line between lands now or formerly of The Texas Company and lands of said AOI herein;

Thence (5) south 64 degrees 10 minutes 10 seconds east along the extension of said boundary line a distance of 4.41 feet more or less to the end of the first course described in the grant made by the State of New Jersey to U.S. Industrial Chemicals, Inc., April 6, 1942;

Thence (6) south 6 degrees 44 minutes 50 seconds west along said first course described in the grant to U.S. Industrial Chemicals, Inc., April 6, 1942, a distance of 270.48 feet to the point and place of beginning.

With the right and privilege under the covenants and conditions of this grant, to exclude the tidewater from so much of the lands above described as lie under tide-water, by filling in or otherwise improving the same, and to appropriate the lands under water above described to its and their exclusive private uses, subject to approval of plans and specifications by Board of Commerce and Navigation or its successors in office.

Being the same lots, pieces or parcels of land conveyed to Ashland Oil & Refining Company, a Kentucky corporation, (name changed to Ashland Oil, Inc. January 29, 1970) by deed dated May 15, 1967 from Archer-Daniels-Midland Company, a Delaware corporation, of record in the Essex County Registers Office in Book 4239 of Deeds at Page 129.

The above described real estate is subject to the following:

1. Rights or claims of parties other than Ashland Oil, Inc. in actual possession of any or all of the property.

2. Unrecorded easements, if any, on, above or below the surface; and any discrepancies or conflicts in boundary lines, and shortage in area or encroachments, if any, which a correct survey or an inspection of the premises would disclose, made subsequent to July 9, 1954.

3. Unrecorded easement for spurs and sidings of Bay Shore Connecting Railroad, and for covered flume, formerly known as Plums Creek; encroachment into subject property concrete wall along Southerly line thereof, and encroachment of bulkhead timbers from subject property into adjoining premises, all as shown on survey dated July 9, 1954, by Borrie and McDonald.

4. Easement for Plumb Creek across subject property and rights of owners adjoining thereto.

5. There is no insurance that the above described property fronts on any public street or highway. (Access to subject property is under terms and conditions of deed recorded in Deed Book M-39, Page 553, and Deed Book Q-41, Page 364.

6. Easement over the most Northerly 15 feet of the above described property recorded in Deed Book 1-94, Page 3, to be used as a roadway.

7. Terms and conditions of three riparian grants recorded in Deed Book R-52, Page 561, Deed Book X-99, Page 403, and Deed Book C-108, Page 152, in the Office aforesaid.

8. Terms and conditions of an unrecorded Riparian Grant from the State of New Jersey

to U. S. Industrial Alcohol Co., dated July 15, 1929.

9. Unrecorded storage contract with Commodity Credit Corporation, dated August 30, 1952.

10. Rights and estates, if any, of U. S. A. in lands lying between original natural high water mark line of Passaic River and the original natural low water mark line of said River.

11. Rights of Board of Commerce and Navigation to regulate construction on the waterfront under Public Law of N.J. 1914, Page 205, Section No. 4.

12. Paramount rights of United States of America over Commerce & Obligue or Navigation, including to fix and alter harbor bulkhead and pierhead line from time to time and to take lands as included therein or remove fill or improvements thereon or thereunder any point below ordinary high water mark line of Passaic River, all without compensation.

13. Terms and conditions of the agreement between Celanese Corporation of America and Archer-Daniels-Midland Company, dated May 31, 1955, recorded in Deed Book 3335, Page 509.

14. Terms and conditions of unrecorded agreement between Bay Shore Connecting Railroad Co. and Baker's Coconut Co., dated December 28, 1921, as recited in instrument recorded in Deed Book P-71, Page 368.

15. Outstanding rights of the State of New Jersey and owners abutting thereon in a tidewater creek to the Westward of the area of Riparian Grant recorded in Deed Book R-42, Page 561.

16. Unrecorded license agreement between Archer-Daniels-Midland Co. and Sun Oil Company, dated July 11, 1963, concerning construction and maintenance of a pile cluster on subject property.

17. Allocable taxes per this Purchase Agreement.

18. Unrecorded side track agreement with Bay Shore Connecting Railroad Co., dated August 24, 1951.

19. Sewer easement being negotiated with the Housing Authority of the City of Newark, New Jersey.

GRANTOR for itself, its successors and assigns warrants and covenants with GRANTEE to defend the title to the property hereby conveyed against the lawful claims and demands of all persons claiming by, through or under GRANTOR, but no other.

IN WITNESS WHEREOF, GRANTOR has caused this instrument to be executed by its duly authorized officers and its Corporate Seal to be affixed as of the day and year first above written.

Signed and acknowledged in the presence of the undersigned attesting witnesses:

David J. DiCentoni

Ronald G. Decker

ASHLAND OIL, INC.

By: E. A. Von Doersten
E. A. Von Doersten
Its: Senior Vice President

ATTEST:

By: Richard J. Lyon
Richard J. Lyon
Its: Assistant Secretary

ASHLAND OIL, INC. SEAL

STATE OF OHIO)
)
COUNTY OF FRANKLIN)

Be it remembered that on the 11th day of December, 1978, before me the subscriber, a Notary Public, authorized to take acknowledgements and proofs in said county and state, personally appeared Richard J. Lyon, to me known, who being by me duly sworn according to law on his oath does depose and make the seal of ASHLAND OIL, INC., the grantor in the foregoing deed named; that the seal affixed to the said deed is the corporate seal of the said corporation, that it was so affixed by virtue of authority from the Board of Directors of the said corporation; that E.A. Von Doersten, as such Senior Vice President did affix said seal thereto, sign and deliver said deed, and heard him declare that he signed, sealed and delivered the same as the voluntary act and deed of said corporation, by virtue of such authority, and that this deponent signed his name thereto, at the same time, as a subscribing witness; the full and actual consideration paid for transfer of title to the realty evidenced by the within deed, as such consideration is defined in P.L. 1968 C.49, Section 1(c), is $1,500,000.

Verla Wright
Notary Public

NOTARY PUBLIC SEAL STATE OF OHIO

Subscribed and sworn to before me at Dublin, Ohio, the day and year aforesaid.

Franklin County, Ohio,
my Commission Expires 2-01-79

This instrument was prepared by
Richard J. Lyon, Attorney-at-Law

5200 Paul G. Blazer Parkway
Dublin, Ohio 43017

945990131

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

CONTENTS

Presentation of the
ECRA Sampling Plan Results
for
SPENCER KELLOGG
FORMERLY A DIVISION OF TEXTRON
400 Doremus Avenue
Newark, Essex County
New Jersey
Volume I of IV

ECRA Case No. 85403

March, 1987

Prepared for

Textron Inc.
Providence, Rhode Island 02903

Prepared by

ENVIRON Corporation
210 Carnegie Center, Suite 201
Princeton, New Jersey 08540

945990133

FMT000473

C O N T E N T S (continued)

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

C O N T E N T S (continued)

* There is no Area of Environmental Concern (AEC) 24 because that AEC was combined with AEC 1.

C O N T E N T S (continued)

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

LIST OF TABLES

LIST OF FIGURES

L I S T   O F   P L A T E S

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

EXECUTIVE SUMMARY

To assist Textron Inc. in complying with the Environmental Cleanup Responsibility Act (ECRA), ENVIRON implemented the New Jersey Department of Environmental Protection (NJDEP) approved Revised Sampling Plan for the Spencer Kellogg facility in Newark, New Jersey. The work was performed from November, 1986 through March, 1987.

For the past several decades, the plant has manufactured coating resins which are used primarily in the paint industry. Based on a series of site visits, a review of past and present site operations, and a review of historical aerial photographs, twenty seven areas of environmental concern (AECs) were identified. To evaluate the effect of past activities at this site on the quality of the soil and the ground water, and as to determine the geologic and hydrogeologic characteristics of the site, forty six soil borings, eleven shallow monitoring wells and three deep monitoring wells were installed. Soil, surface water, and ground water samples were collected and analyzed for the chemicals potentially present due to activities within the AECs.

Four geologic units were encountered at the site. The uppermost unit is comprised of fill material and extends from the ground surface to an average depth of 8 feet. Beneath this lies a clay, silt and peat unit with an average thickness of 19 feet. A well sorted sand and gravel unit, which varies in thickness from 13 to 14 feet, underlies the clay, silt and peat. Beneath the sand and gravel is a reddish-brown clay and silt unit of unknown thickness.

Two aquifers were encountered at the site. The shallow aquifer lies within the fill unit. The shallow and deep aquifers are separated by the thick clay, silt and peat unit which acts as a semi-confining layer. The deep aquifer was encountered at an average depth of 27 feet below ground surface. The direction of ground water flow in the shallow aquifer is primarily toward an underground flume which travels beneath the site and discharges into Newark Bay. The direction of ground water flow in the deep aquifer is toward Newark Bay.

The analytical data suggest that ethylbenzene, toluene, and petroleum hydrocarbons in concentrations above the informal BISE cleanup guidelines have been introduced into the soil of the fill unit by operations and activities at the facility. Because of problems inherent with the analysis for total petroleum hydrocarbons, it is not possible to distinguish between petroleum hydrocarbons and the non-hazardous fish and vegetable oils which have been used in large quantities at this facility. Therefore, some of what is reported as petroleum hydrocarbons may be the non-hazardous fish and vegetable oils. In addition, the presence of petroleum hydrocarbons in widely varying concentrations in soil samples collected from areas in which no operations are known to have occurred suggests that the presence of some of the petroleum hydrocarbons detected at the site may be related to the fill material rather than to operations at the facility.

Despite the presence of significant concentrations of ethylbenzene, toluene and petroleum hydrocarbons in certain areas of the fill unit, very little contamination was detected in the shallow aquifer. The pavement which covers the site appears to prevent the infiltration of rain water from the surface and thus inhibits the migration of contaminants from the soil matrix into the ground water. Petroleum hydrocarbons were detected in only one shallow well, the upgradient well MW2, and apparently originate from an off-site source. Relatively low concentrations of volatile organics were detected in three of the eleven shallow wells. In a fourth shallow well, more significant concentrations of volatile organics were detected, but this contamination appears to be related to localized soil contamination. The apparently low partitioning of contaminants from the soil to the ground water, as evidenced by the relatively low concentrations of contaminants in ground water, suggest that minimal contaminant transport from the site is occurring.

The results of analyses performed on water samples collected from the underground flume support this hypothesis as well. Only one contaminant, ethylbenzene, appears to be introduced into the flume as it travels beneath the site, and this contaminant may be entering the flume through storm drains that discharge to the flume, rather than from the infiltration of ground water.

In the deep aquifer, no contamination was found in either of the upgradient wells, but volatile organic contamination was detected in the downgradient well, MW22. The data suggest that the contamination detected may be due to a defect in the well, which may allow the infiltration of water from the flume to occur during purging of the well, rather than to actual contamination within the deep aquifer. Further investigation is necessary to evaluate this explanation.

In the Phase Two Sampling Plan, which will be submitted to NJDEP at a later date, sampling will be proposed to further delineate the areal extent of contamination in certain portions of the site, to refine the current understanding of the ground water flow patterns at this site, and to clarify other issues which were not resolved in this first phase of sampling. The second phase of sampling is likely to include the collection of additional measurements from existing wells and from the underground flume as well as the installation of additional soil borings. Additional monitoring wells may also be added. Finally, Textron may begin evaluating cleanup levels that might be appropriate should in a Cleanup Plan be necessary for this site. Thus, the Phase Two Sampling Plan may include an evaluation, based on available toxicity data, of the health and environmental risks associated with exposure to various levels of the contaminants found at this site.

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

I. INTRODUCTION

A. Purpose and Scope

In order to comply with the requirements of the New Jersey Environmental Cleanup Responsibility Act (ECRA), Textron Inc. ("Textron") submitted a Revised Sampling Plan for the Spencer Kellogg facility in Newark, New Jersey to the New Jersey Department of Environmental Protection (NJDEP) in July, 1986.* Conditional approval of the Revised Sampling Plan was received from NJDEP on October 7, 1986. On behalf of Textron, ENVIRON Corporation implemented the approved sampling program during November and December, 1986, and into early January, 1987. Additional field measurements were made during February and March, 1987. This report presents the data gathered during the implementation of the Revised Sampling Plan and an interpretation of the results obtained. Additional collection of data will be necessary before an appropriate Cleanup Plan for the site may be designed. A Phase Two Sampling Plan will be submitted to NJDEP to address these data needs.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site is located across from the tip of Kearny Point, where the

---

* Spencer Kellogg was formerly a division of Textron Inc. As authorized by the July 25, 1985, Textron Inc. Administrative Consent Order under ECRA, Textron sold this Spencer Kellogg facility (among others) to NL Industries, Inc. NL Industries, Inc. currently owns and operates this facility.

Passaic and Hackensack Rivers join to form Newark Bay. The location of the facility is depicted on Figure 1. This site, which was formerly marshland, had been filled in by the early part of this century as evidenced by historical aerial photographs.*.

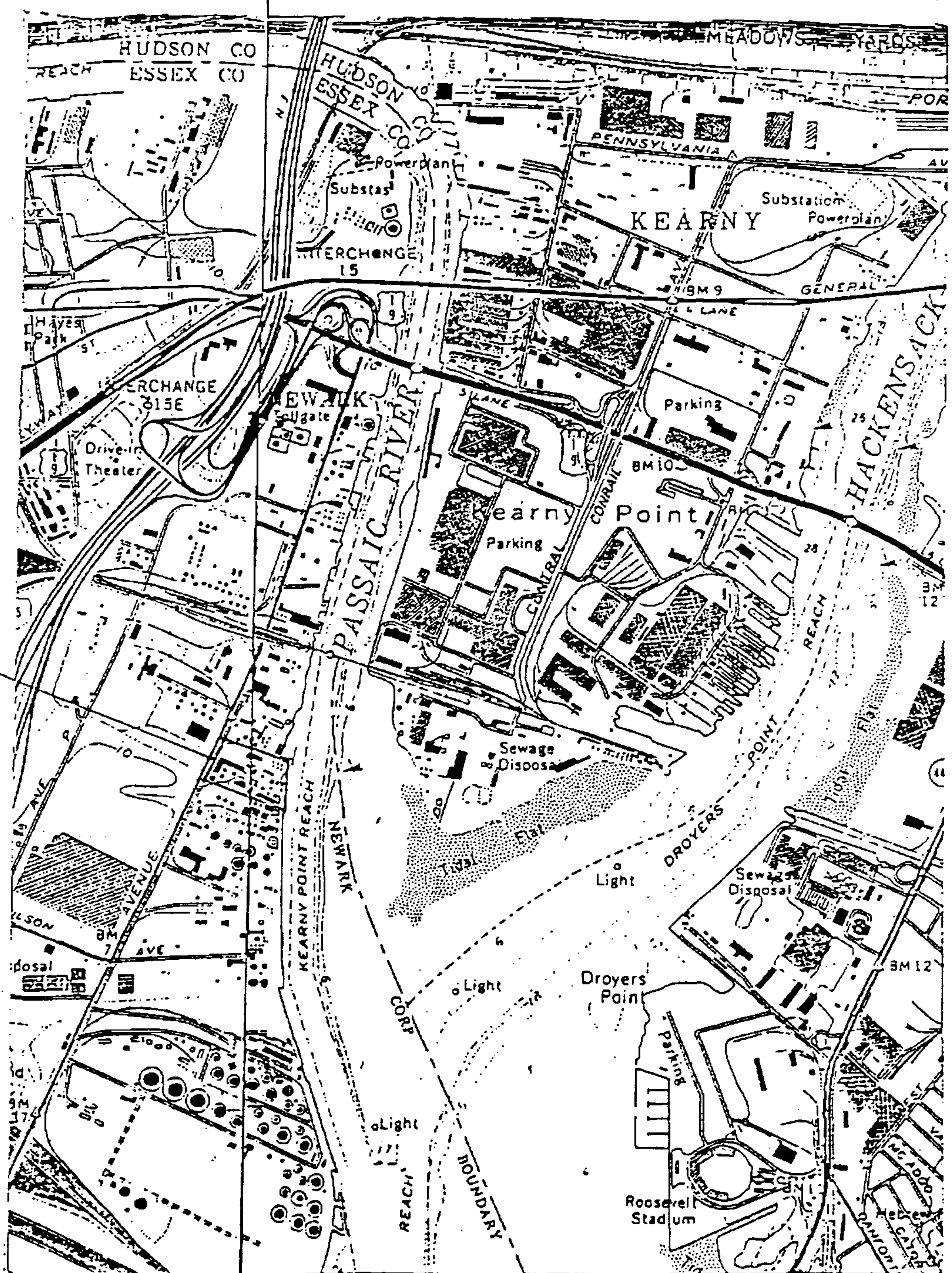
Discussions with former Textron employees indicate that this site has been used as a manufacturing facility since the first or second decade of this century. Formerly, the site was used as an alcohol distillery. Since the late 1930s, it has been used for the manufacture of resins. Some of the materials used in the resin manufacturing process are considered hazardous under ECRA.

The main features of this site are depicted on Plate 1. A concrete breakwall is located along Newark Bay and the northeast corner of the property. West of the property (on the other side of Doremus Avenue) is a landfill which is drained by Plum's Creek. The creek enters an underground flume, through which it flows under Doremus Avenue and the Spencer Kellogg facility. The underground flume discharges from a pipe in the breakwall into Newark Bay. The site, which is now paved, was not entirely paved throughout the entire period during which resin manufacturing took place at this facility.

* The historical aerial photographs (stereo pairs) from 1940, 1951, 1961, 1969 and 1974 were submitted previously to NJDEP for this site.

- Elizabeth, N.J., Quadrangle

Jersey City, N.J. Quadrangle -



Site

AKH000343

ENVIRON

USGS Topographic Map

Figure

945990147

C. Regional Geology

The Spencer Kellogg facility is located in the Piedmont Physiographic Province of New Jersey. The Triassic Brunswick Formation forms the bedrock beneath the site. In the Newark area, the top of the Brunswick Formation, which consists of non-marine, generally reddish-brown mudstone and siltstone, has eroded to form a bedrock valley. The axis of this valley runs north-south and is approximately 2 miles to the northwest of the Spencer Kellogg site. The valley floor along the axis lies about 200 feet below mean sea level (MSL). The bedrock at the site lies approximately 50 feet below mean sea level.*

The sediments between the top of the Brunswick Formation and the ground surface consist mainly of glacial till deposited during the Wisconsin Glacial Period in the Pleistocene Epoch. In central Newark, lacustrine and sandy clay overlain by stratified glacial drift fill the valley.

ENVIRON Corporation assisted in an ECRA soils and ground water investigation at a facility on Kearny Point, approximately one mile from the facility. The data gathered from this nearby site indicated the presence of two aquifers in this region. Therefore, a similar hydrogeology was expected at the site. The work performed by ENVIRON at the Spencer Kellogg site comfirmed the presence of two aquifers.

---

* Nichols, William D., U.S. Geological Survey, Ground Water Resources of Essex County, New Jersey, Special Report No. 28, 1968.

D. Rationale for the Sampling Program

Twenty-seven areas of environmental concern (AECs) were identified at this facility. Each area and the rationale for its selection as an AEC are described and discussed in the Revised Sampling Plan.* This information is summarized in Table 1. The AECs and each of the locations sampled during the implementation of the Revised Sampling Plan are depicted on Plate 1.

Soil borings were drilled in most of the AECs to determine if compounds defined as hazardous under ECRA were present and, if so, to determine the degree as well as the vertical extent of contamination. In some instances, monitoring wells were placed downgradient of AECs. This occurred where access with a drilling rig within an AEC was not possible and thus soils could not be sampled directly.

Additional shallow wells were installed to obtain ground water quality data at upgradient and downgradient locations as well as to supplement the hydrogeologic understanding of this site. Because of data obtained from another site in this area which suggested the presence of a deep aquifer, three clusters of deep and shallow wells were also installed to investigate the degree and extent of communication between the deep and shallow aquifers. Two of these well clusters (MW2, MW21,

---

* The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

and MW1, MW23) as well as the shallow well MW6 were placed to monitor the quality of the ground water entering the site based on the assumed direction of ground water flow toward the Bay.

To gain an understanding of the effect of the underground flume on the soil and water quality of the site, the sediments and the water were sampled at the point at which Plum's Creek enters the underground flume and at the outfall into Newark Bay. A background chloride sample was collected from Newark Bay.

In Building 26, several floor drains with an unknown point of discharge were identified. A dye test was conducted to determine where these drains discharge.

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 1: Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of likely discharge onto unpaved region from dumpster and compactor which receive waste from buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of likely discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of likely discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of suspected contamination beneath building on stilts. Raw materials and finished products from polyester resin manufacturing process may have spilled through hole in the floor.
10	Current raw materials storage area. Before area was paved, area was used for finished product and raw materials storage.
11	Former above-ground storage tank located in unpaved area.

1 The locations of the Areas of Environmental Concern are depicted in Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
12	Building on stilts with apparent evidence of spills or discharges beneath.
13	Site of former above-ground storage tanks while area was unpaved.
14	Site of former above-ground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with apparent evidence of spills.
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former above-ground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix (a hazardous waste) has been stored in drums.
23	Tank wagon loading area for building 4 where 1285 Premix may be generated.

1 The locations of the Areas of Environmental Concern are depicted in Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
25	Tank wagon loading area for building 26 where 1285 Premix may be generated.
26	Drains in large tank farm which discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, DEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, DEP site inspection).

1 The locations of the Areas of Environmental Concern are depicted in Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

AKU00074

945990153

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

The Revised Sampling Plan describes in detail the proposed sampling program, including the locations and depths at which samples were to be collected and the analyses to be performed on each sample. Very few changes were made during the implementation of the sampling plan. These changes are described in Section II.F.

II. METHODOLOGY -- A TECHNICAL OVERVIEW

A. Soil Borings

1. Drilling Methods

Most of the soil borings were drilled using a hollow stem auger. In some cases, other soil sampling methods were used including a hand auger, a split spoon driven with a sledge hammer, and a trowel. The soil borings were plugged with grout, and some were capped with asphalt. The drilling and plugging method used for each boring is described in the boring logs attached to this report as Appendix A. The boring logs also include the geologic log, the drilling specifications, a description of split spoons collected while drilling and a description of the collection depth and analysis to be performed on each sample collected for each boring.

2. Soil Sample Collection Methods

Soil samples were collected for analysis from each soil boring (except the pilot boring*) and from most of the wells. For the borings and the shallow wells, soil samples were collected at the surface (usually from a depth of 6 to 18 inches below the surface) and from the 1-foot segment of the soil column above the water

---

* Before the deep wells were installed, a pilot boring was drilled down to the clay and silt layer beneath the deep aquifer to characterize the lithology at the site.

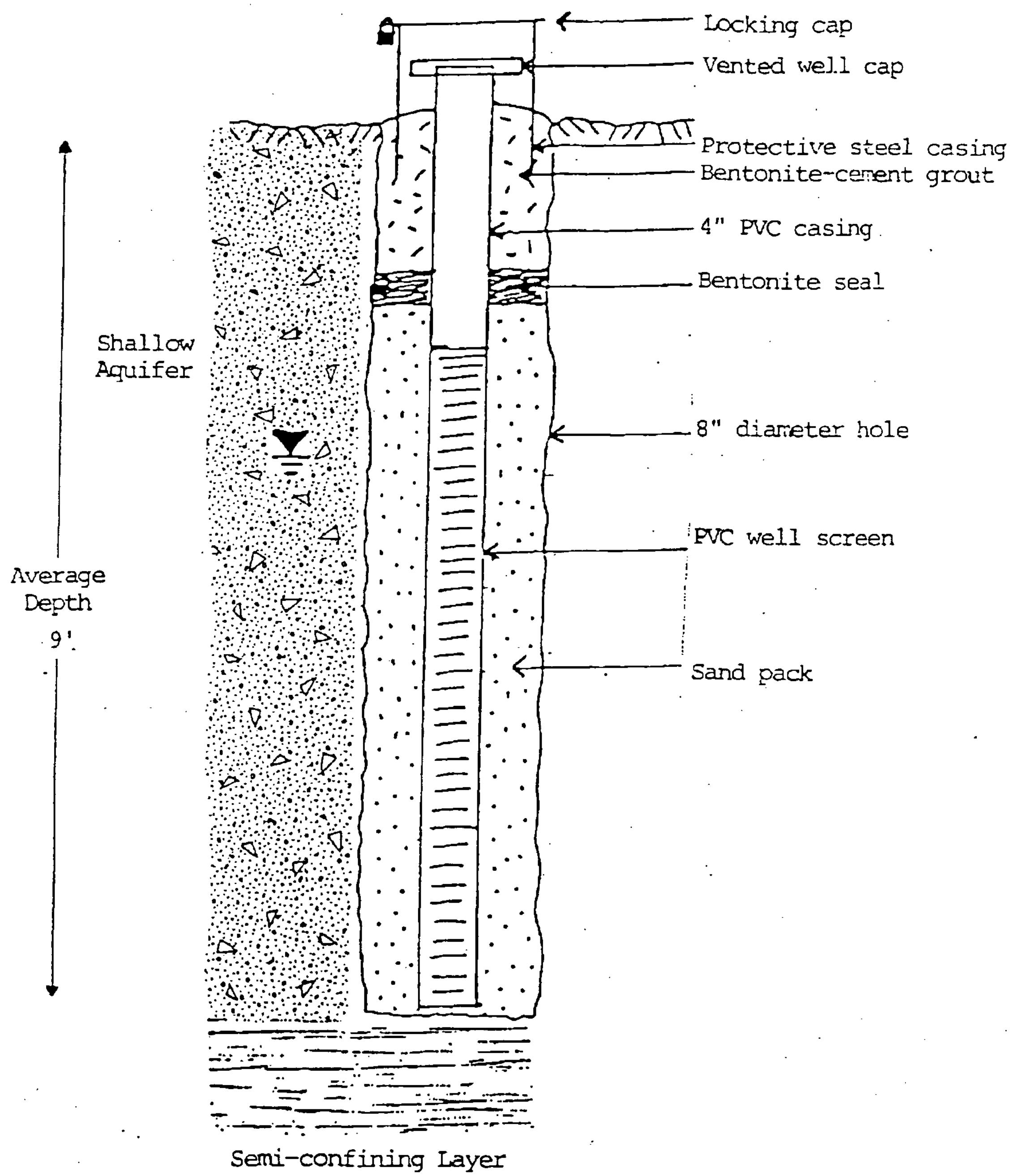
table. Because of the high water table encountered at the site (usually between 2 and 4 feet below ground surface), the surface sample was often within one foot of the water table. Thus, at many locations only one sample was collected. From each of the deep wells in addition to the samples collected from near the surface, a soil sample was collected from immediately above the deep aquifer.

For the samples collected at the surface, the portion to be used for the volatile organics analysis was collected from the lower part of the sampling interval. Because of low split spoon recoveries in some of the split spoons collected, it was not possible to determine for these spoons what depth range the soil within the split spoon represented. Under these circumstances, the sample collected from the small quantity of soil within the split spoon was recorded as having been collected from the depth range of the entire split spoon.

B. Monitoring Wells

1. Shallow Well Construction

In general, the borehole for each shallow well was drilled with a hollow stem auger rig through the first water bearing unit to the top of the semi-confining unit. The well was then screened from the bottom of the aquifer to approximately 2 feet above the water table. The typical construction of the shallow wells is depicted on Figure 2.



ENVIRON
Counsel in Health and Environmental Science

SPECIFICATIONS FOR THE SHALLOW WELLS

Figure 2

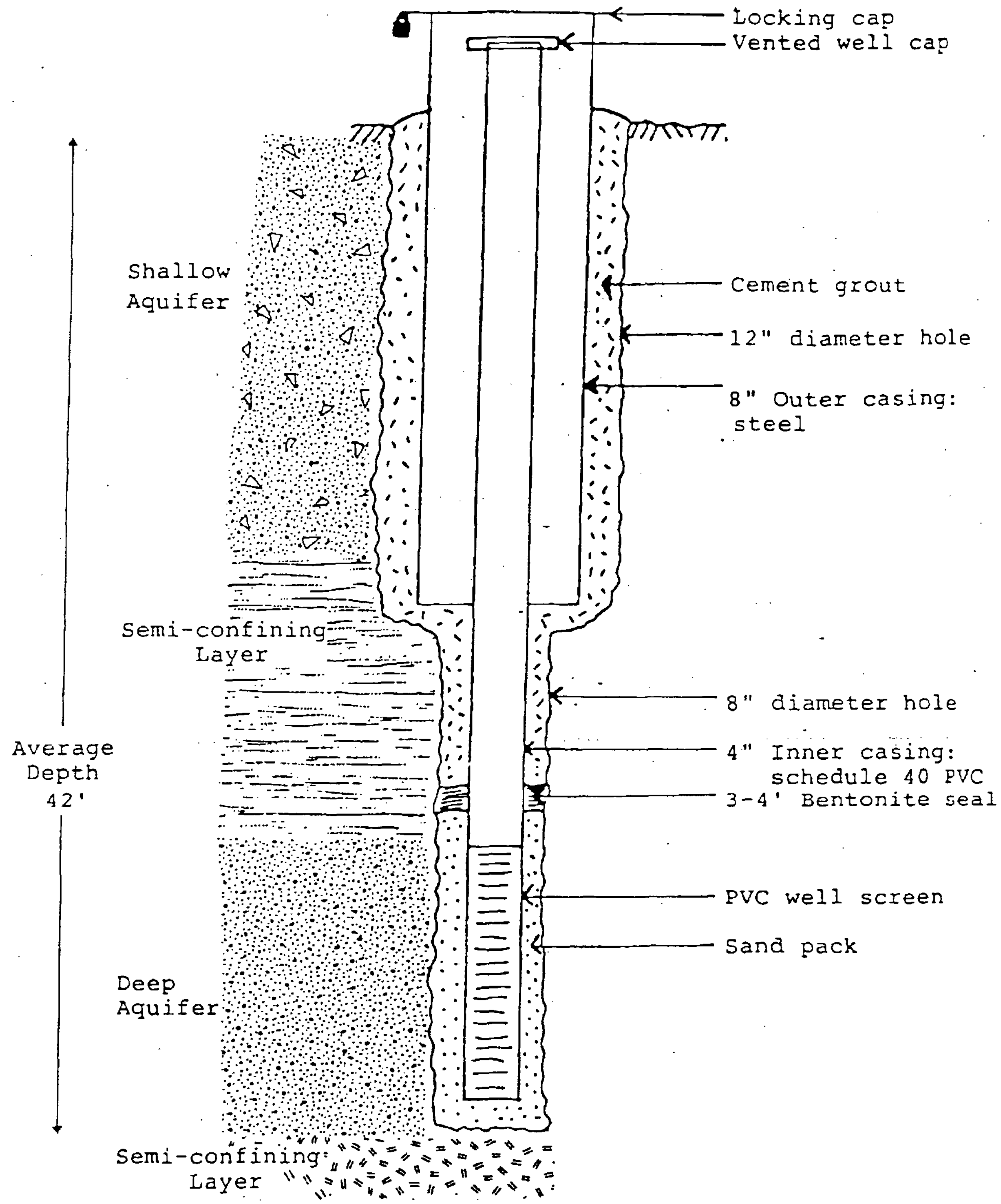
Monitoring Wells 9 and 11, however, were not constructed in this fashion. These wells were installed to monitor underground tanks in AEC 20 and AEC 6, respectively. NJDEP requested that the wells be screened to the depth of the bottom of the underground tanks. To do so, each of these wells was installed and screened partially within the confining layer.

Detailed technical information on each of the monitoring wells is provided in the well specifications, included as Appendix B. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for all of the shallow wells are summarized in the Summary of Well Data, included as Appendix C.

2. Deep Well Construction

The three deep wells are telescoped wells to prevent the downward migration of potentially contaminated ground water from the shallow aquifer. The boreholes for the outer casings were augered to a minimum of 1.5 feet into the semi-confining layer. The augers were then removed, the boreholes filled with cement grout, and outer steel casings installed. The grout was allowed to harden for at least 18 hours before construction continued.

The inner casing was installed by using mud rotary to drill through the outer casing and down to the confining layer beneath the lower aquifer. The well was screened over the entire lower aquifer. The typical construction of the deep wells is depicted on Figure 3.



AKH000355

ENVIRON	SPECIFICATIONS FOR THE DEEP WELLS	Figure 3

Detailed information concerning the monitoring wells are included in Appendix B. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for each of the deep wells are also included in the Summary of Well Data (Appendix C).

3. Well Completion

Two types of well completion were used: flush mounts and stick ups. To avoid obstructing operations at the facility, shallow wells MW3 and MW4 and the deep well/shallow well cluster MW8 and MW22 were completed flush with the ground surface. For each of these wells, the outer casing extends to the ground surface and is capped with a curb box. The inner casing was cut off approximately 0.5 feet below the ground surface and was covered with a locking cap.

All other monitoring wells were completed with a two foot stick up. The PVC inner casing and the stainless steel protective casing (for the shallow wells) or outer casing (for deep wells) were cut off approximately 2 feet above the ground surface. A vented cap was placed on the inner casing and a locking cap was placed on the stainless steel casing.

4. Monitoring Well Development

Empire Soils Investigations, Inc. developed all 14 monitoring wells between November 17 and November 24, 1986. Empire pumped each of the shallow wells, except MW7, using a centrifugal vacuum pump. MW7 and the three deep wells were developed using air surging. Each of the monitoring wells was developed properly to remove most of the fines from the well. Except for MW11, each of the wells was developed either for an hour or until 55 gallons of water had been removed. MW11 was developed for one-half hour and yielded 45 gallons. The rates of yield, estimated from development times, ranged from 0.08 to 16 gallons per minute. The well development data, including the type of pump used, the development time, the total yield, the rate of yield, and-a description of the water removed is summarized in Appendix D.

5. Monitoring Well Sampling Methods

The monitoring wells were sampled by Century Laboratories, Inc., a state certified laboratory. Monitoring Wells 3 through 11 and 21 through 23 were purged of between 3 and 5 volumes of water or pumped until dry before sampling, as is consistent with NJDEP and RCRA* requirements. MW1 was purged in the same manner, however, due to an inadvertant omission, these data were not recorded. The temperature, pH, and conductivity of the water being purged were monitored at regular intervals during the purging of most of these wells. Because of equipment problems, for a few of the wells only two of these parameters were monitored. Water samples were not

* Resource Conservation and Recovery Act

collected until these parameters had stabilized indicating that the water was being drawn from the aquifer rather than the stagnant zone around each well. The data collected while purging are summarized for each well in Appendix E.

After the purging was completed, each well was allowed to recover before a sample was collected. The time elapsed between the completion of the purging and the collection of the sample did not exceed two hours.

The sampling method, the number of well volumes removed and the time elapsed between purge completion and sample collection are included for each well in the Supplementary Well Sampling Data. This supplementary data can be found in Appendix E.

6. Tidal Influence Investigation

To characterize the nature and extent of tidal influence on the ground water, water levels were monitored in both the shallow wells and the deep wells. On December 10, 1986, water levels at each of the 14 monitoring wells were measured over a complete tidal period. Measurements were taken on approximately an hourly basis, with a total of 14 measurements per well. On February 24, 1987, a series of depth to water measurements were taken from each monitoring well near high tide and again near low tide to confirm the patterns observed in the December, 1986, measurements. On March 5, 1987, the water elevation of the Bay and of the three wells located nearest to the Bay (Monitoring Wells 7, 8 and 9) were measured near hightide. Water samples were collected from each of the wells for chloride analysis at the time each well was sampled for other analyses to determine the salinity of the ground water in each of these locations.

C. Underground Flume Sampling

To characterize the water quality of the underground flume, samples were collected simultaneously at the point at which Plum Creek enters the flume and at the outfall into Newark Bay (the Bay). Water and sediment samples were collected at the inflow location to the underground flume. Because no sediment was present at the outfall of the flume, only a water sample was collected from that sampling location. These samples were collected at low tide.

Chloride samples were taken to monitor the degree of tidal flushing within the flume. The chloride samples were collected from the inflow to the flume, the outfall to the Bay which is normally under water except at very low tides, and from the Bay at a point upgradient from the outfall. Because the samples were collected at low tide, the upgradient Bay sample, collected from north of the outfall, is likely to have a lower chloride concentration than a Bay sample collected at high tide. The sampling locations are indicated on Plate 1.

D. Quality Assurance/Quality Control Measures

1. Decontamination Procedures

All sampling equipment, including split spoons, hand augers and trowels were decontaminated by steam cleaning with potable water before the collection of each sample. In addition, the augers and other downhole drilling equipment were steam cleaned between each hole. To avoid cross-contamination between samples, fresh gloves were used to collect each sample.

2. Control Samples

To provide quality control, duplicate samples, field blanks, and trip blanks were collected in the manner described in the Revised Sampling Plan. Twenty-three duplicate analyses were performed on samples collected during the sampling program. Eleven field blanks were collected and analyzed for the same parameters for which samples were collected during the day the field blank was collected. In addition, a total of seven trip blanks were collected and analyzed for volatile organic compounds plus a forward library search (VOC+15).

E. Deviations from the Revised Sampling Plan

Several minor changes were made to the Revised Sampling Plan, both before and during the implementation of the sampling program. Each of these changes is described below. Many of these modifications were discussed with NJDEP by telephone and in correspondence, and approval from NJDEP was received. Reference to specific conversations or correspondence, where appropriate, is incorporated into the descriptions provided below.

- The system for numbering soil borings was changed after the submission of the Revised Sampling Plan. In the new numbering system, the first one or two digits refer to the AEC number while the last two digits specify the particular boring within that AEC. For example, the three borings in AEC 12, formerly numbered 64, 74, and 75, are now numbered 1201, 1202, and 1203.
- The water table at the site was found to be quite high. At most locations it was found between 2 and 4 feet below ground surface. The Revised Sampling Plan had proposed the collection of two soil samples above the water table, one at the surface and one in the 1-foot segment above the water table. In several locations, the water table was so high that only one soil sample was collected. The AECs in which this occurred were AECs 2, 3, 7, 13, 14, 15, 16, 17, 18, 21, 25, 27, and 28. For the same reason, only one soil sample was collected above the water table in Monitoring Wells 5 and 21.
- As described in the September 26, 1986, letter to Christine Hylemon, the NJDEP Case Manager, the locations of the well cluster MW2 and MW21, as well as the shallow wells MW5 and MW6 were moved slightly to avoid obstructing operations at the plant. For this

same reason, well clusters MW8 and MW22 and the shallow well MW3 were installed flush to the ground surface. The shallow well MW4, which ENVIRON had initially proposed to move to avoid obstructing operations, was installed flush to the ground because a suitable location which did not obstruct operations could not be found.

- In the October 2, 1986, conditional approval of the Revised Sampling Plan, NJDEP requested that Textron collect three random surface soil sample to analyze for metals. In a November 13, 1986, telephone conversation with Phil Sandine, the NJDEP Technical Coordinator for the case, ENVIRON discussed the reasons against performing this sampling at this time. It was agreed during this telephone conversation that sampling for background metal concentrations would be postponed until (1) it was established that priority pollutant metals in concentrations in excess of the Bureau of Industrial Site Evaluation (BISE) informal guidelines were indeed present at the site, and (2) an appropriate method for evaluating background metal levels was agreed upon. These issues are discussed in greater detail in the December 31, 1986, letter to Christine Hylemon from ENVIRON.
- Due to an error on the part of the analytical laboratory, the PCB/pesticide portion of the Priority Pollutant + 30 (PP+30) analysis was conducted on both soil and water samples undergoing the PP+30 analysis although this portion of the analysis had been specifically excluded in the Revised Sampling Plan.

- In AECs 1, 2, 5, and 9, analysis of the samples for maleic anhydride and phthalic anhydride had been proposed. No methods for analyzing either of these compounds in soil have been established. Century Laboratories, however, after researching potential methods and discussing a variety of analytical approaches with both technical staff of the United States Environmental Protection Agency and with quality assurance/quality control staff of NJDEP, designed a method for analyzing for these two compounds. Due to difficulties encountered while attempting to extract the samples to prepare them for analysis, the laboratory has been unable to obtain any analytical results. At this time, Century Laboratories is not aware of any workable method for analyzing for either maleic anhydride or phthalic anhydride in soils.
- As described in ENVIRON's September 26, 1986, letter to Christine Hylemon, an additional boring was proposed in AEC 3 after an apparent spill was observed during a site visit.
- In the October 2, 1986, NJDEP conditional Sampling Plan approval, NJDEP requested that the samples in AEC 4 be analyzed for volatiles and total petroleum hydrocarbons (TPHC) in addition to the proposed fingerprint analysis. These analyses were performed as requested. In addition, NJDEP requested that the portion of the sample to be analyzed for volatiles be collected from 6 to 12 inches. This was done at Boring 401. However, at Boring 402 the

sample to be analyzed for volatiles was inadvertently collected from 0 to 6 inches.

- Downgradient of AEC 6 (an underground fuel oil tank), MW11 was constructed as proposed. Because of underground obstructions encountered while attempting to drill MW11 (apparently foundations from former buildings in this area), this well was installed slightly further downgradient from the underground tank than originally proposed. The two borings in which obstructions were encountered were labeled Borings 601 and 602. The soil samples which were to have been collected from MW11 were collected from Boring 601 instead.
- To gain access to AEC 9, a hole was to be drilled through the floor of Building 16 so that soil samples could be collected from beneath the building. NJDEP requested in the October 2, 1986, conditional Sampling Plan approval that the sample to be analyzed for volatile organics be collected from a depth of 6 to 12 inches. When the concrete floor was cored through, a resin-type material was encountered, instead of the expected two-foot air space. This material could not be penetrated because of its hardness and therefore the soil beneath could not be reached. Instead, a split spoon was driven with a sledge hammer into this material and the material sampled.
- In the October 2, 1986, conditional approval, NJDEP requested that the samples to be analyzed for volatile organics in AEC 12 be

collected from a depth of 6 to 12 inches. Because of the consistency of the soil encountered under Building 4, the difficult sampling conditions, and the constraints imposed by the necessary safety gear, it was not possible to go down to a depth of one foot for Borings 1202 and 1203. Therefore, for these two borings, the samples to be analyzed for volatile organics were collected from depths of 0.4 to 0.7 feet and 0.0 to 0.5 feet, respectively.

- A review of the historical aerial photographs and further discussions with former Textron employees at the facility revealed that the actual location of AEC 13, a former tank farm, is slightly south of where it was originally believed to have been present. Its adjusted location is indicated on Plate 1. The three soil borings proposed for this AEC were placed within the adjusted location.
- In the conditional approval of October 2, 1986, NJDEP requested that three borings instead of one boring be placed in each of the following AECs: 13, 14, 15, 16, and 21. These additional borings were drilled as requested.
- Boring 1702 from AEC 17 and the samples collected from it were inadvertently labeled Boring 1502. This error has been noted and corrected in the text and figures. The three borings from AEC 15 are labeled 1501, 1502 and 1503.

- In AEC 18, the sample from Boring 1801 to be analyzed for polycyclic aromatic hydrocarbons (PAHs) was inadvertently not collected.
- As described in ENVIRON's letter to Christine Hylemon of September 26, 1986, ENVIRON proposed to place a boring within AEC 19. This boring, 1901, was collected and analyzed for TPHC and VOC+15.
- In AEC 22, ENVIRON had proposed to collect a soil sample from the thin layer of soil on top of the pad on which Tank 301 had been located. However, NL Chemicals which currently owns and operates the facility had cleaned all of the soil off of this pad. This step had been taken to comply with a request associated with NL Chemicals' attempt to delist the plant as a RCRA Treatment, Storage and Disposal facility. Because the soil was cleaned off of the pad and placed in a pile before the implementation of the sampling program began, ENVIRON discussed alternative sampling for this area with Christine Hylemon on October 16, 1986. ENVIRON was instructed to collect the soil sample from the pile of soil. This sample was collected during the implementation of the Revised Sampling Plan.
- As described in ENVIRON's September 26, 1986, letter to NJDEP, the area designated at AEC 24 was combined with the area designated as AEC 1 and is now called AEC 1. Therefore, there is no AEC 24.
- As described in the September 26, 1986, letter from ENVIRON to NJDEP, no sampling was performed in AEC 26 because the drains

which were to have been sampled had been plugged by NL Chemicals in order to comply with Discharge Prevention Control and Countermeasure Plan requirements.

- At MW1, where no soil samples had been proposed, duplicate soil samples were collected above the water table and analyzed for the parameters proposed for MW23. Soil samples were collected from MW23 as well. MW1 and MW23 form the well cluster at the northwest corner of the property.
- At MW6, no soil sample was collected immediately above the water table. Instead, the lower soil sample was mistakenly collected from below the water table at a depth of 6 to 7 feet.
- At the well cluster of MW8 and MW22, the surface soil sample to be collected from MW22 had insufficient recovery for sample collection. This surface sample was collected from MW8 instead.
- At MW9, the full PP+30 analysis was performed on the soil samples collected instead of just the VOC+15 analysis which had been proposed.
- At sampling location 32, the outfall of the underground flume into Newark Bay, sediment samples as well as water samples had been proposed. There was no sediment present at the outfall, so only a water sample was collected from this location.

F. Analytical Laboratory

All of the samples collected at this site were analyzed by Century Laboratories, Inc., of Thorofare, New Jersey. This laboratory is a state certified laboratory. Under the direction of ENVIRON Corporation, Century Laboratories also collected the water samples from each of the monitoring wells.

G. Surveying of Sampling Locations

After the sampling program was completed, the physical features of this site as well as the locations and elevations of the monitoring wells and most of the borings were surveyed by James M. Stewart Inc. of Philadelphia, Pennsylvania, a licensed surveyor. ENVIRON personnel measured the locations of certain borings. The ground surface elevations and coordinates available from the surveyor are included in this report as Appendix G.

III. GEOLOGIC AND HYDROGEOLOGIC RESULTS

A. Site Geology

1. Topography

The site, which is approximately 6 feet above sea level, is relatively flat. The ground surface elevation varies by less than 2 feet across the site. In some areas, the ground surface is somewhat uneven where the fill has subsided around the pilings which supported former structures on the site. The topographic map of the site is included as Figure 4.

2. Site Stratigraphy

Four distinct geologic units were encountered while drilling at this site. The upper unit is comprised of fill material. Beneath this lies a layer of clay, silt and peat. A unit of sand with some gravel lies beneath the clay, silt and peat layer. This sand and gravel unit is underlain by a clay and silt unit. Each of the geologic units and their average thicknesses are depicted on the Generalized Geologic Column, Figure 5. A discussion of each of the units is included below. A more detailed description of the geology encountered at each sampling location is provided in the boring logs and in the well specifications (Appendices A and B).

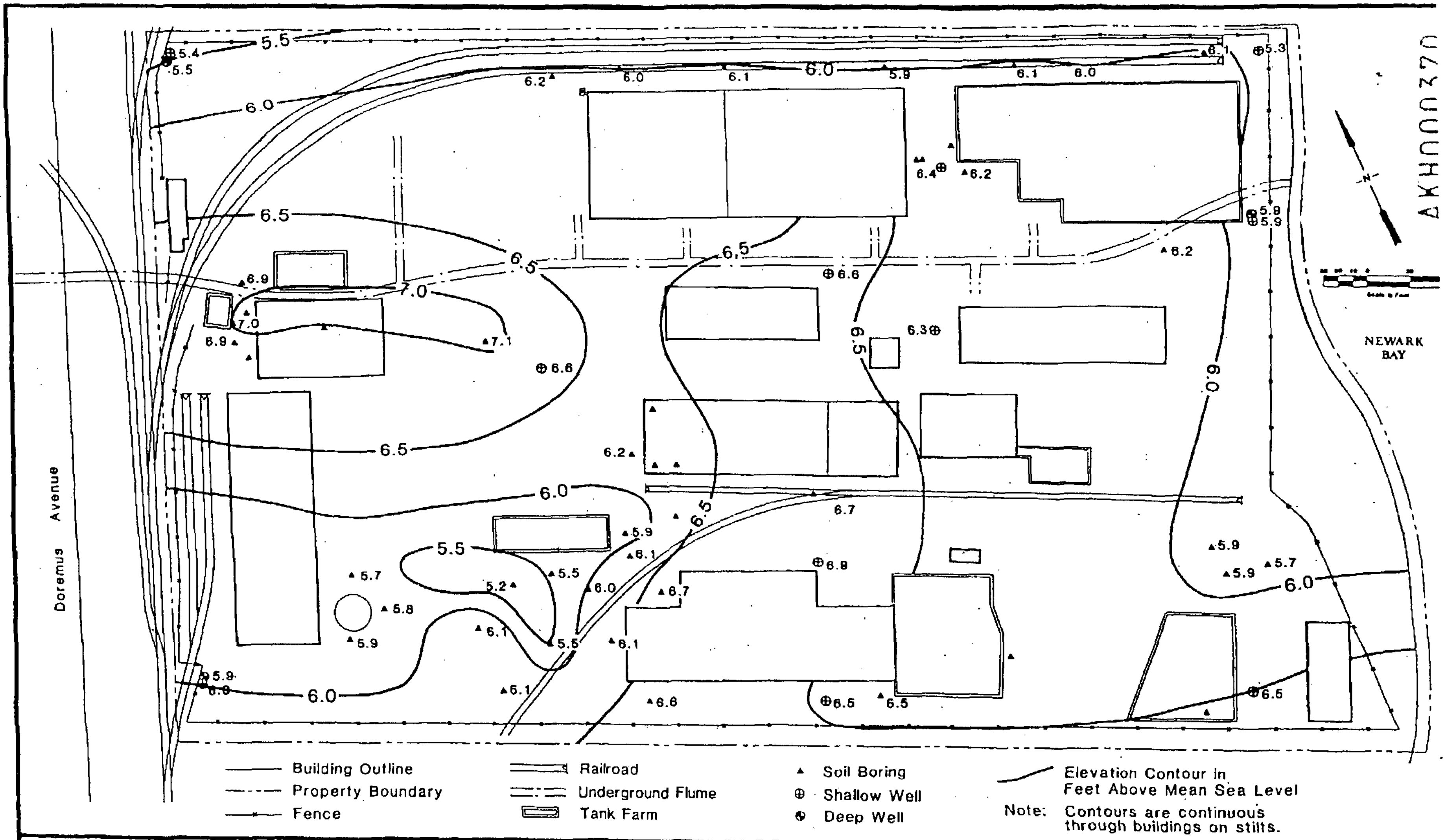


Figure: 4

Topographic Map

ENVIRON
Counsel in Health and Environmental Science

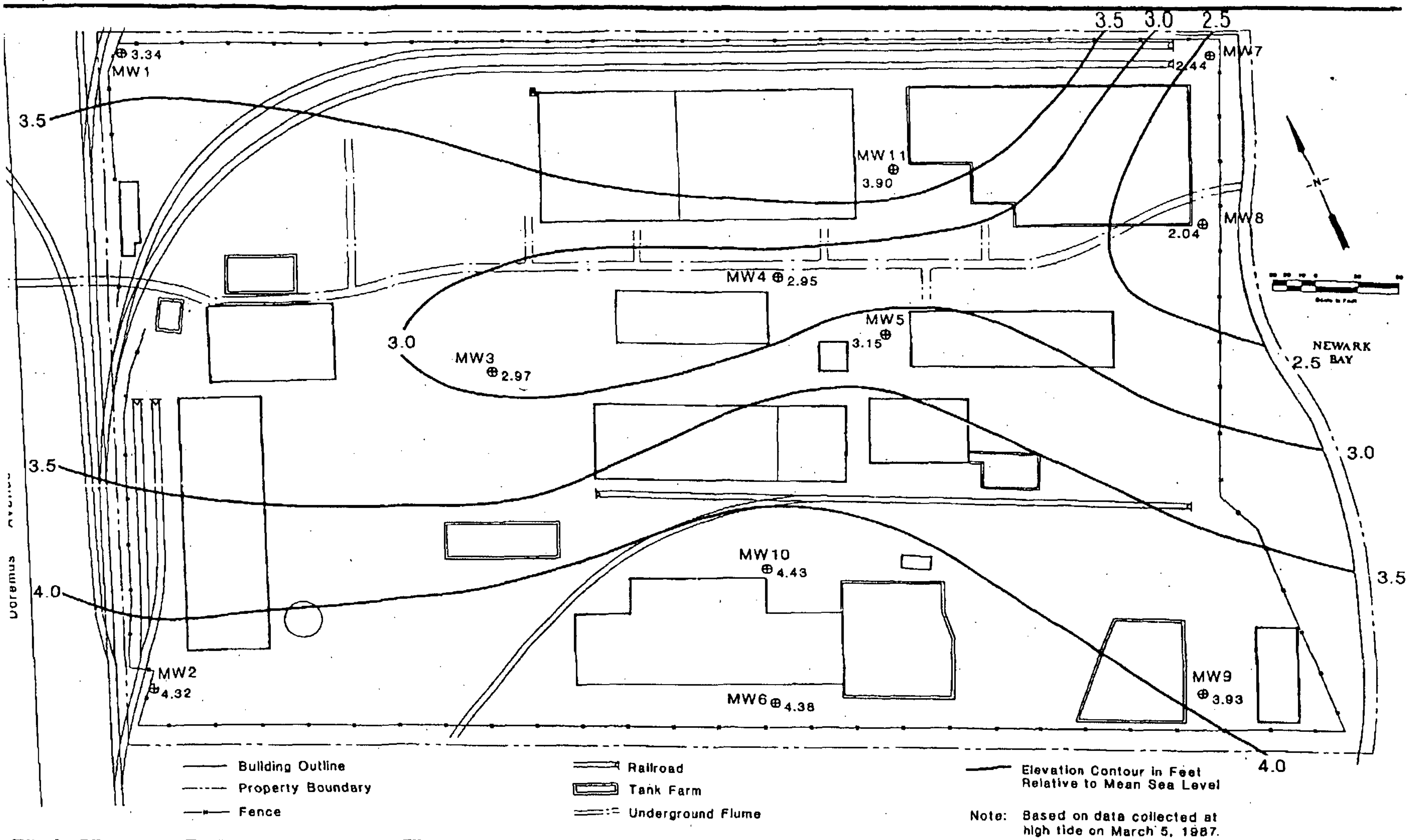
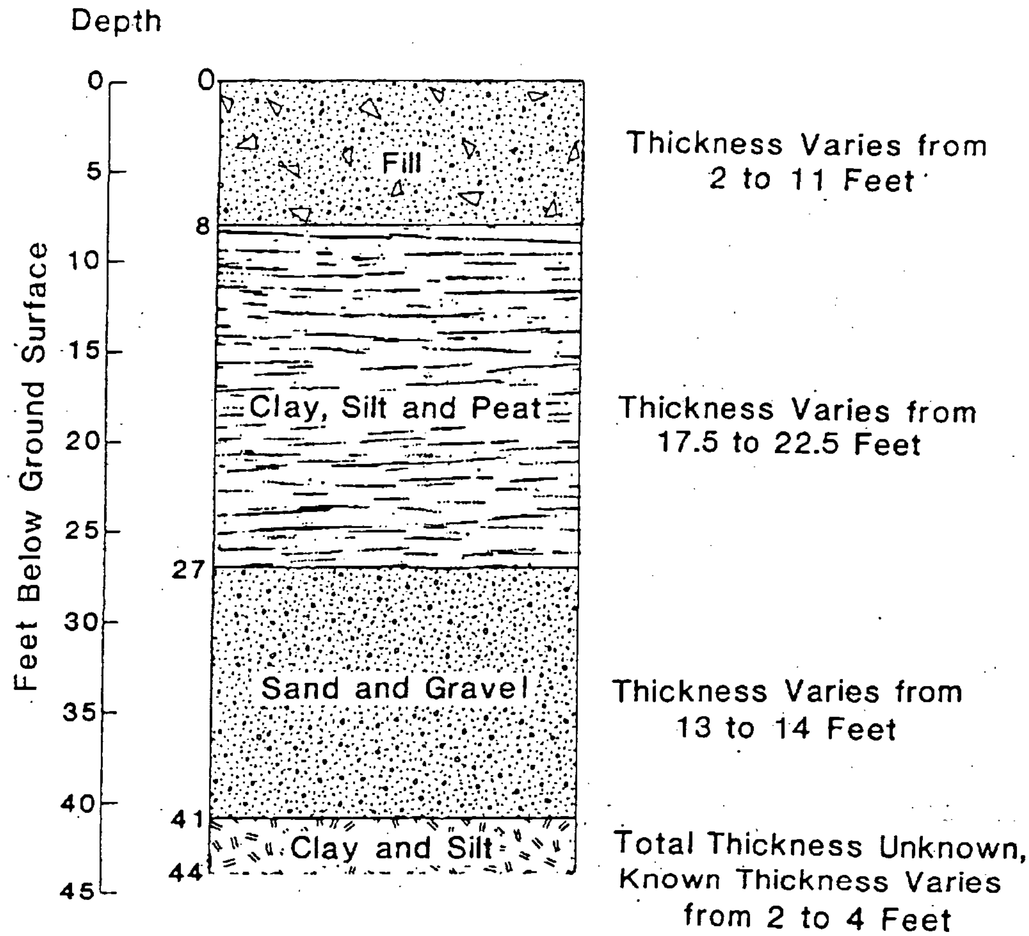


Figure: 9 | Shallow Aquifer Water Table | ENVIRON Counsel in Health and Environmental Science

AR000271

945990175

000515



Thickness shown in column is an average thickness over the entire site compiled from the fourteen sets of well data.

ENVIRON Counsel in Health and Environmental Science	Generalized Geologic Column Spencer Kellogg Site Newark, New Jersey	Figure 5

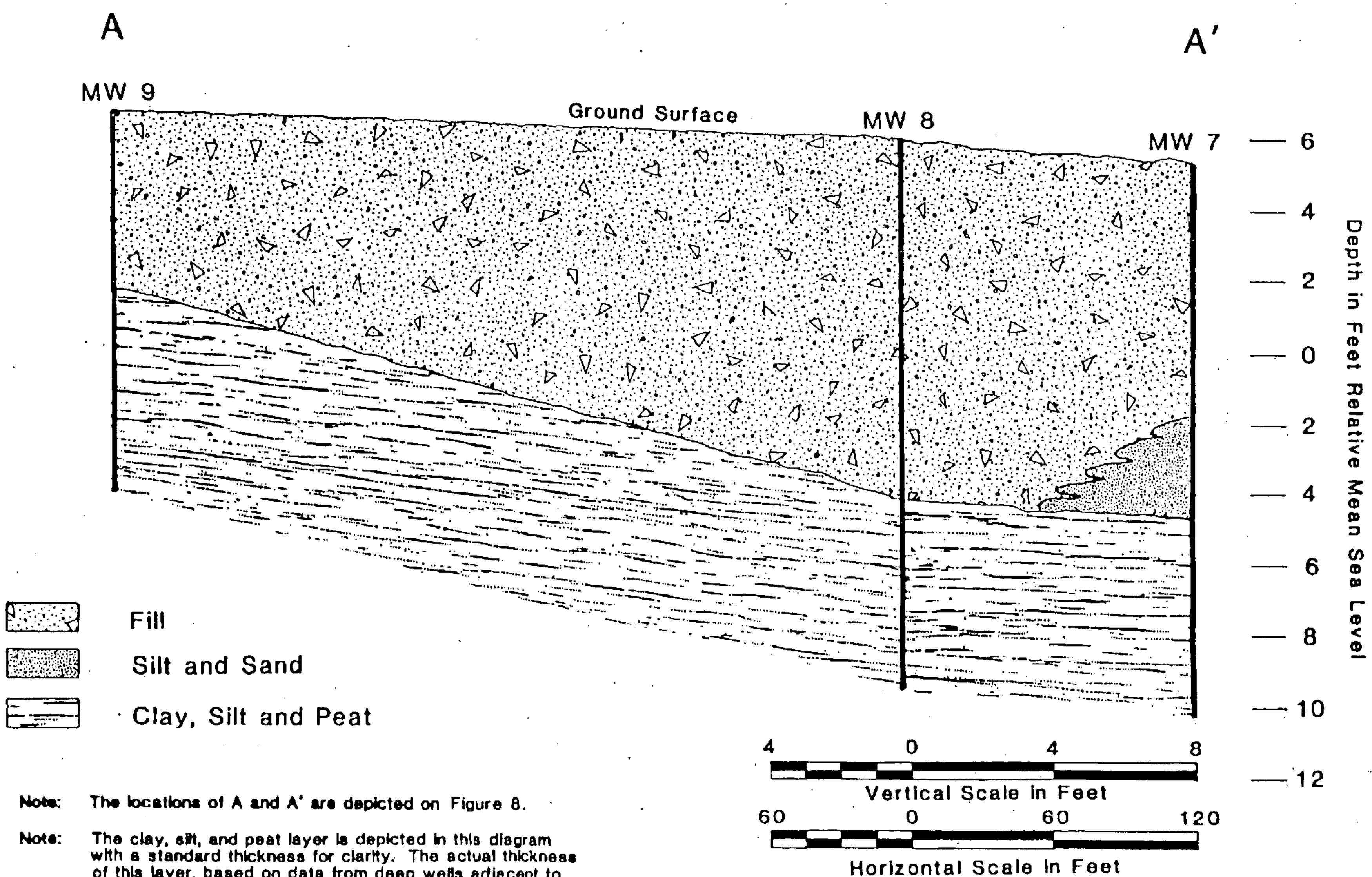
3. <u>Fill Unit</u>

The upper unit is comprised of fill material. The fill has an average thickness of 8 feet, but varies in thickness from 2 to 11 feet across the site. The fill material is composed primarily of sand and gravel mixed with other materials including crushed brick, glass and pottery fragments, and cinders.

The fill unit is depicted in greater detail in the Shallow Well Fence Diagram (Plate 2). The fence diagram gives a three-dimensional view of the fill layer and the top of the underlying clay, silt and peat unit based on the geologic logs from each of the shallow wells. The depth of the fill unit is relatively constant throughout the site.

As the fence diagram indicates, native soils between the fill unit and the clay, silt and peat unit were encountered at two of the well locations. Around Monitoring Well 2, a sand and gravel layer was encountered, and at Monitoring Well 7, a silt and sand layer was encountered. Throughout the rest of the site, no other layers were found between the fill unit and the clay, silt and peat unit.

The interface between the fill unit and the clay, silt and peat unit generally follows the contours of the ground surface. Near Newark Bay, the interface slopes gently toward the south, as indicated on Figure 6, a geologic cross-section from MW9 to MW7. Near the center of the site, the clay, silt and peat unit is mounded around MW10 and MW11 and forms basins around MW6 and MW7 as depicted



Note: The locations of A and A' are depicted on Figure 8.

Note: The clay, silt, and peat layer is depicted in this diagram with a standard thickness for clarity. The actual thickness of this layer, based on data from deep wells adjacent to shallow wells 1, 2, and 8, varies from 17.5 to 22.5 feet.

ENVIRON Counsel in Health and Environmental Science	Geologic Cross-Section From A to A'	Figure 6

FMT000518

on Figure 7. The locations of these cross-sections are shown on Figure 8.

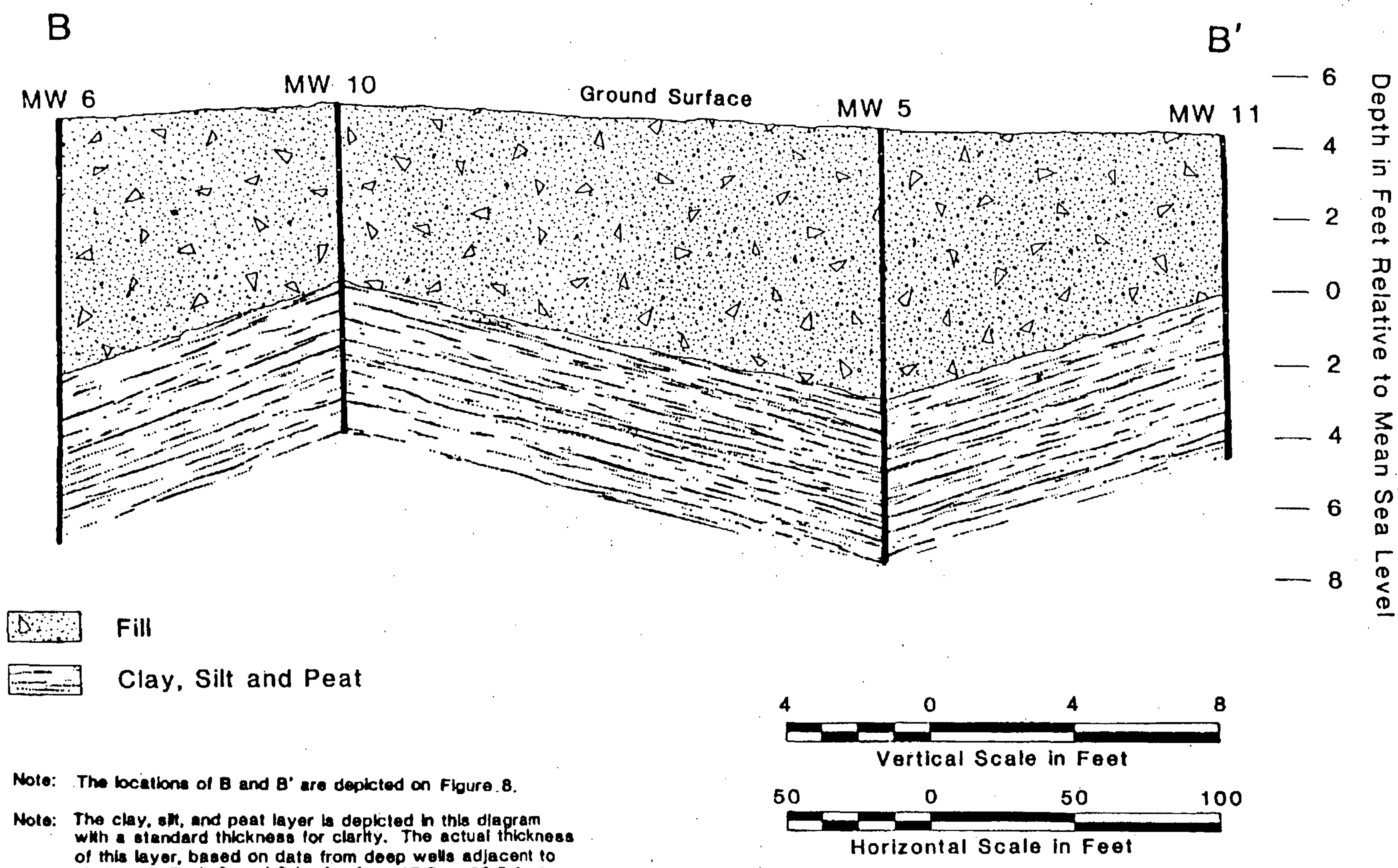
4. Clay, Silt and Peat Unit

The unit which lies beneath the fill is comprised of clay, silt and peat. It extends to an average of 19 feet below the bottom of the fill unit. Its thickness appears to change very little across the site, ranging from 18 to 22 feet. The relative concentrations of the clay, silt and peat within this unit vary both vertically and horizontally throughout the site. This unit is characterized by a black to dark grey color. Fossil bivalves were sometimes found within this unit. The peat varied from poorly decomposed to well decomposed, depending on the location and depth. This unit appears to be a swamp deposit.

5. Sand and Gravel Unit

The third unit is composed primarily of well sorted sand with some gravel. The unit varies in thickness from 13 to 14 feet across the site. The sand is fine to medium-grained at the top of this layer and increases in coarseness with depth. This unit appears to be a fluvial deposit.

The Deep Well Fence Diagram (Plate 3) depicts the geology encountered while drilling the three deep wells and the pilot boring. The uniform thickness of this unit is illustrated by this diagram.



Note: The locations of B and B' are depicted on Figure 8.

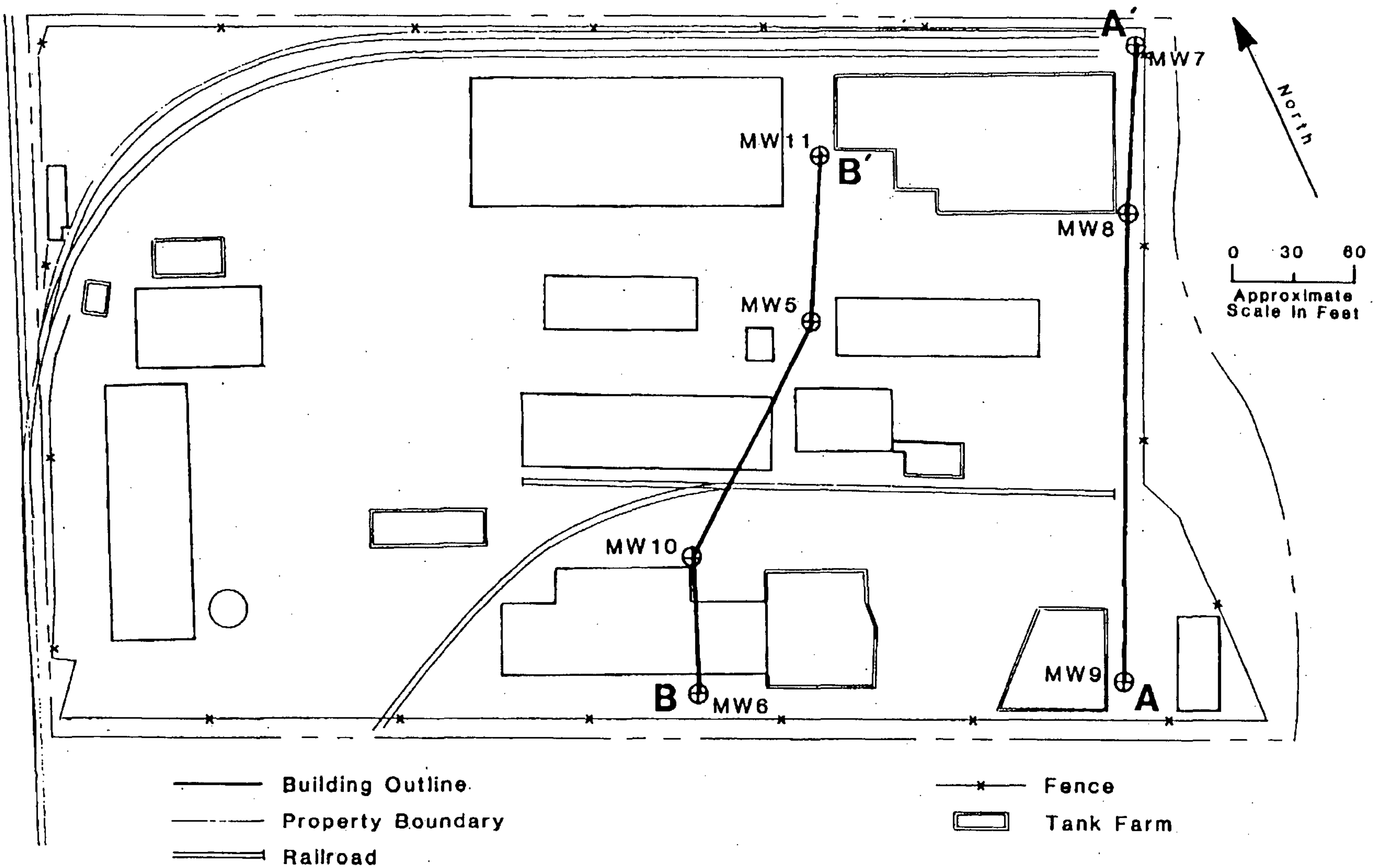
Note: The clay, silt, and peat layer is depicted in this diagram with a standard thickness for clarity. The actual thickness of this layer, based on data from deep wells adjacent to shallow wells 1, 2, and 8, varies from 17.5 to 22.5 feet.

ENVIRON

Counsel in Health and Environmental Science

Geologic Cross-Section From B to B'

Figure 7



ENVIRON
Counsel in Health and Environmental Science

Locations Of Geologic Cross-Sections

Figure 8

6. Deep Clay and Silt Unit

Beneath the sand and gravel unit lies a clay and silt unit. Because no drilling extended to more than 2 to 4 feet into this layer, the total thickness is unknown. The relative concentrations of the clay and silt varied among the locations at which this layer was encountered. This clay and silt layer is characterized by a reddish-brown color.

B. Site Hydrogeology

1. Introduction

Ground water beneath the Spencer Kellogg facility occurs in two aquifers separated by a semi-confining layer. The shallow aquifer, semi-confining layer and deep aquifer coincide with (1) the fill unit, (2) the clay, peat and silt unit and (3) the sand unit, respectively. These units have been described in Section A.

2. Shallow Aquifer

The fill unit in which the shallow aquifer is located consists of poorly sorted, coarse grained material with a relatively high porosity and permeability. The flume is located within this aquifer. It has its intake at Plum's Creek, west of the facility and its outfall at Newark Bay. The flume is believed to be constructed of half of a pipe originally approximately 36 inches in diameter and covered by wood. Its invert is believed to be located below the depth of the water table.

A map of the water table was constructed using depth to water measurements from the shallow wells, as shown in Figure 9. The depth to water across the site is approximately 2 to 4 feet. The water table appears to follow the general topography. For example, ground water in the vicinity of Monitoring Well 10, which is located on a slight topographic high, is relatively shallow.

The sides of Newark Bay drop off sharply just beyond the breakwall to form a deep shipping channel. Twenty-five feet east of the property, the depth of the channel is approximately 20 feet below mean sea level. Because the fill unit extends no more than 5 feet below mean sea level and the breakwall extends deeper than this, the shallow aquifer does not continue into the Bay, but ends at the breakwall.

The flow of ground water within the shallow aquifer is affected by several factors. The underground flume apparently acts as a lined sink for ground water flow. As depicted on Figure 9, the direction of ground water flow is toward the underground flume. The breakwall along Newark Bay is constructed of broken boulders and concrete blocks covered by poured cement and extends to a depth of at least 11 feet below the ground surface. This wall and the breakwalls of neighboring facilities to the south and north prevent the ground water from discharging directly into Newark Bay. As a result, shallow ground water flows parallel to the shore except where breaks in this barrier occur, such as at the flume outfall.

Building foundations appear to obstruct the flow of shallow ground water in some areas. For example, ground water in the vicinity of Monitoring Well 11 is relatively high. The area surrounding Monitoring Well 11 is one of the few unpaved areas at this site and may act as an area of recharge. However, flow away from this area appears to be restricted by a foundation of a former building in this area, and the foundations of Building No. 31, the large tank farm and the grain silo. These barriers may cause ground water to mound at this location.

3. Semi-Confining Layer

The clay, silt and peat unit, which underlies the fill unit across the site, acts as a semi-confining layer. This swamp deposit has low permeability and restricts the vertical flow of water between the shallow and the deep aquifers.

The permeability of the clay, silt and peat unit beneath Newark Bay is unknown. Because Newark Bay drops off to a depth of 20 feet below sea level very close to the facility, it is likely that the clay, silt and peat unit is partially eroded away under Newark Bay. In addition, this layer may undergo a facies change beneath the Bay, possibly grading into more permeable sediments.

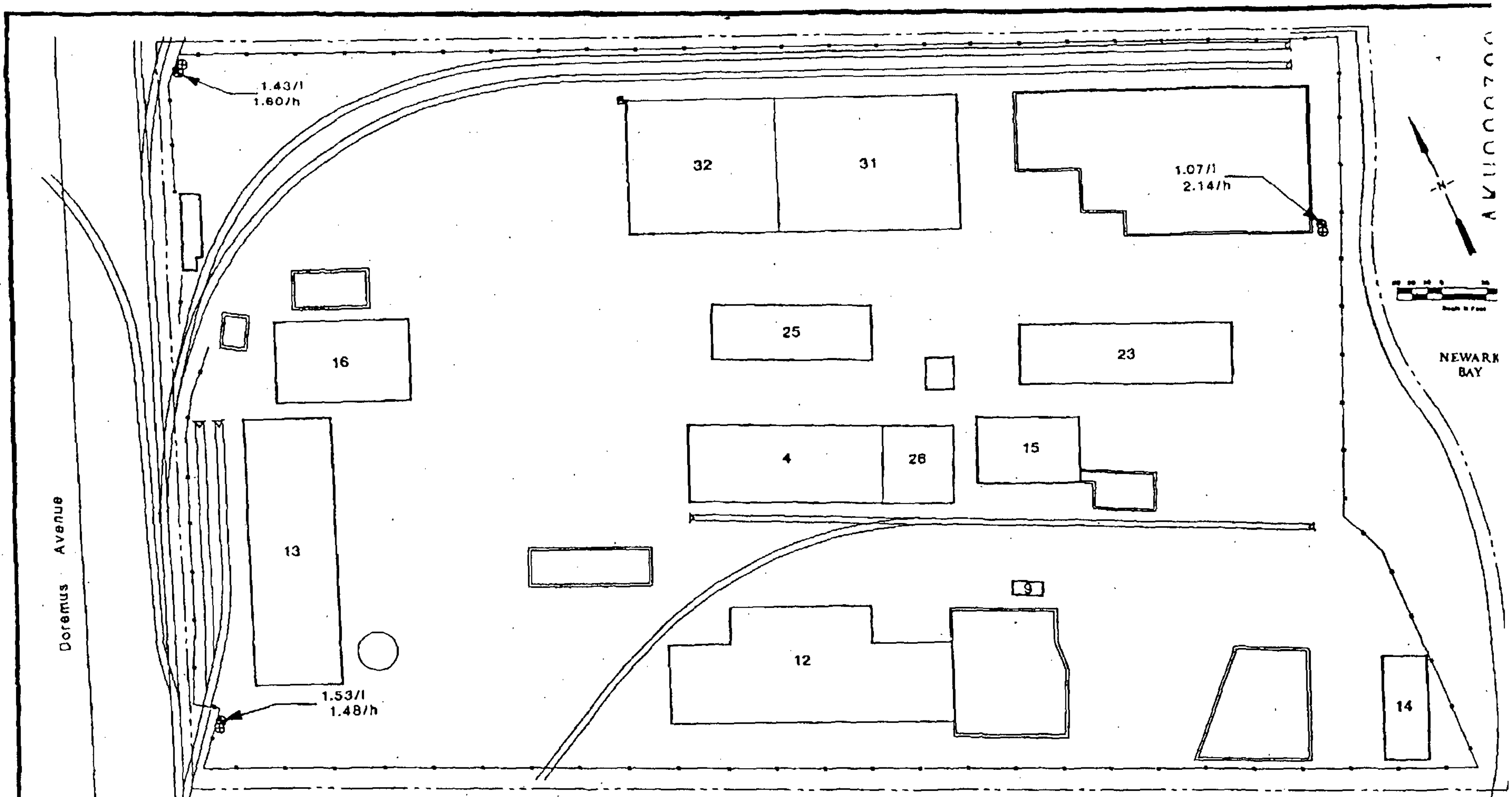
4. Deep Aquifer

The sand unit described in Section A constitutes the deep aquifer. These well sorted fluvial sediments possess moderate porosity and permeability. This aquifer is artesian, and water levels in the deep wells are approximately 4 feet below the ground surface. Water elevation measurements from the deep wells in this aquifer are shown in Figure 10. Ground water flow in this aquifer does not appear to be obstructed. The general flow direction is from west to east, into Newark Bay.

Underlying the deep aquifer is another semi-confining layer. This clay and silt unit was encountered by each of the deep wells. The clay and silt unit is dry and appears to be restricting vertical flow of ground water.

5. Tidal Influence

The proximity of the site to Newark Bay results in tidal fluctuations of water levels in several of the monitoring wells installed at the facility. Water level fluctuations of approximately five feet per tidal cycle are observed in Newark Bay. To determine if this fluctuation influences the direction of the flow of ground water at this site, several rounds of depth to water measurements were taken throughout a complete tidal cycle. These measurements and predicted water level elevations for Newark Bay are graphically presented in Figures 11 through 14.

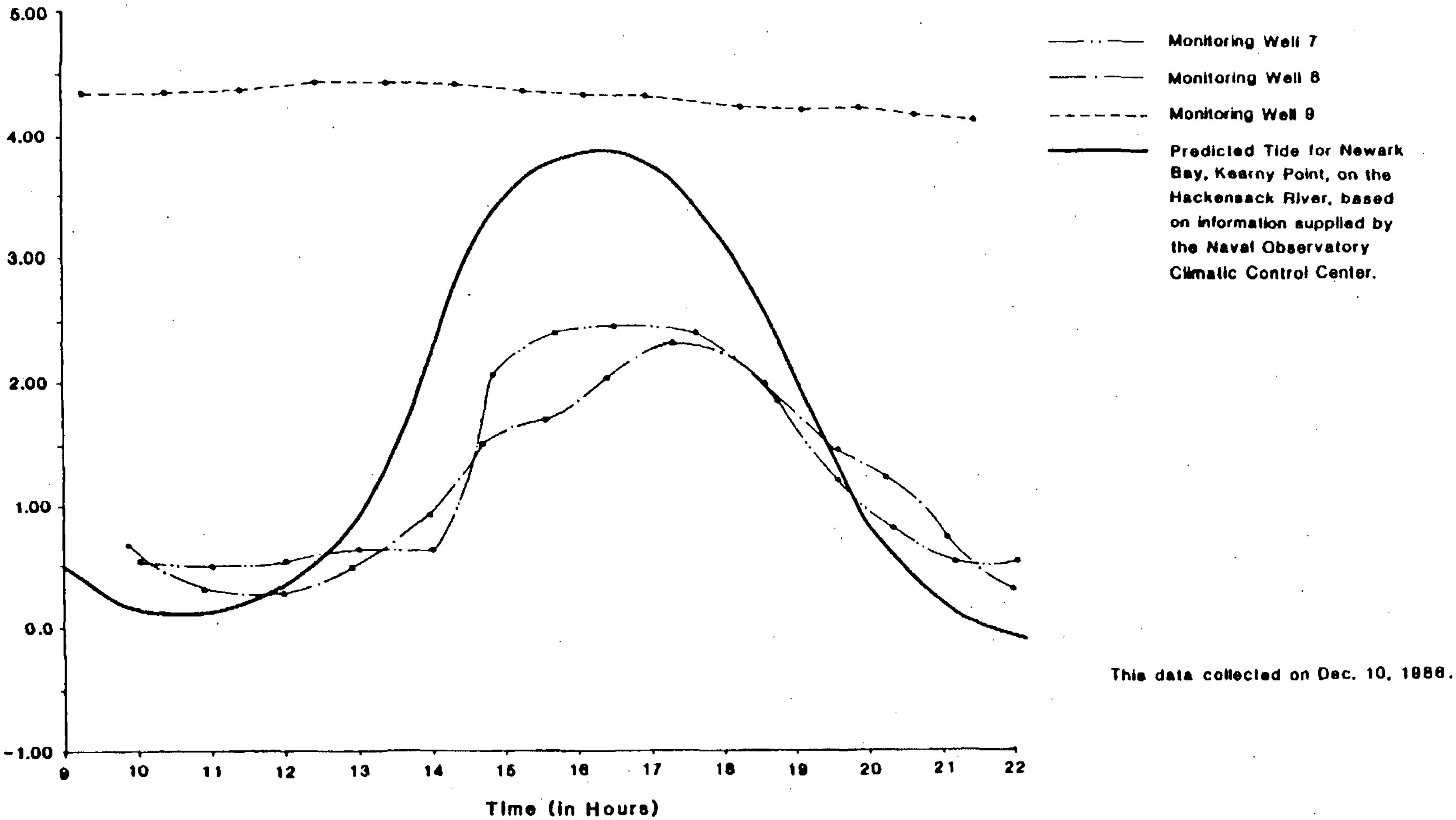


Building Outline
Property Boundary
Fence
Railroad
Tank Farm
0.00/l Elevations at Low Tide
0.00/h Elevations at High Tide
Note: Data collected on December 10,1986.

Figure: 10	Deep Aquifer Water Elevations	ENVIRON Counsel in Health and Environmental Science

945990186

FN 00526

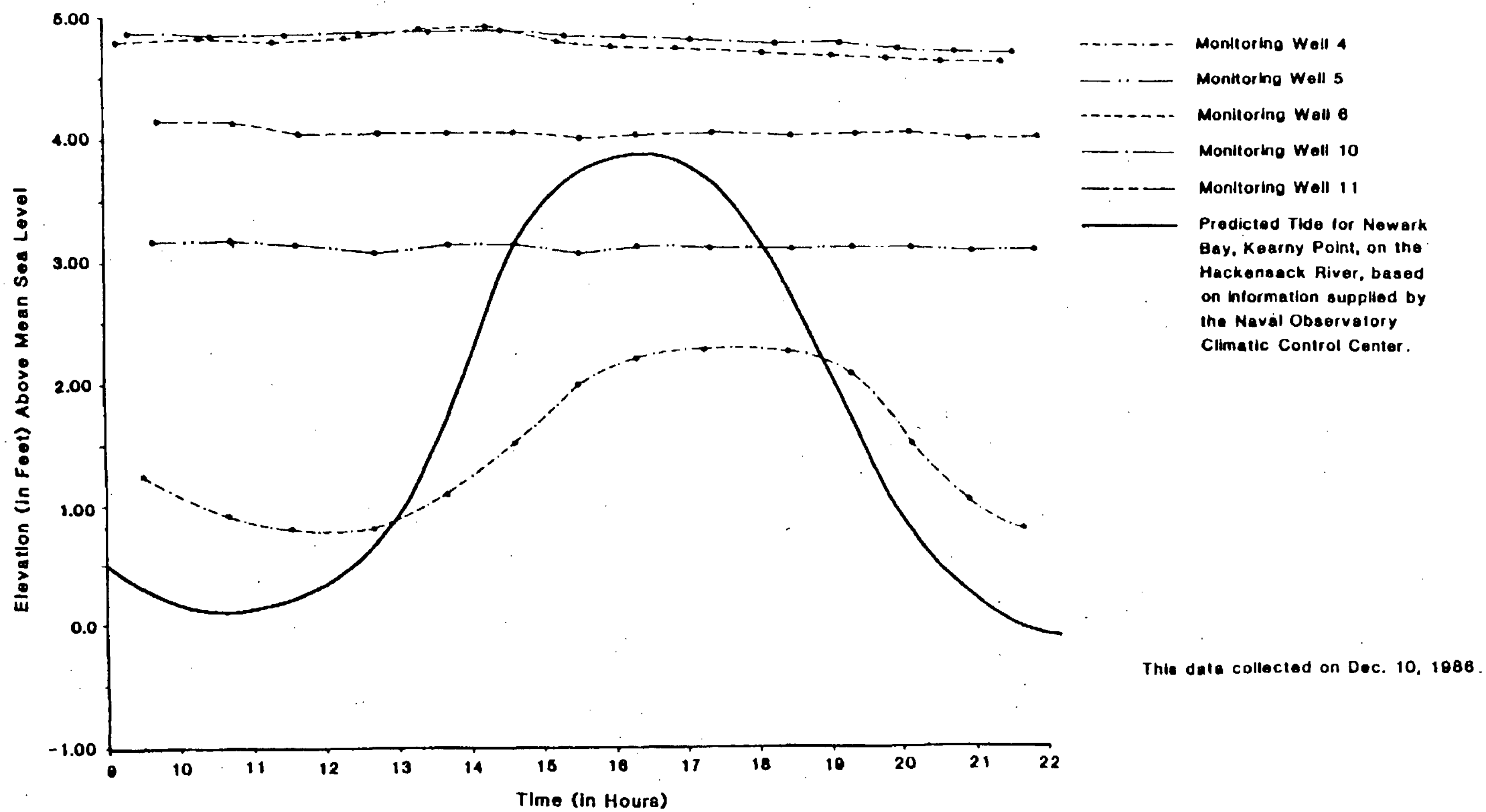


NVIRON

nsel in Health and Environmental Science

Tital Variations in Monitoring Wells:
MW7, MW8 and MW9

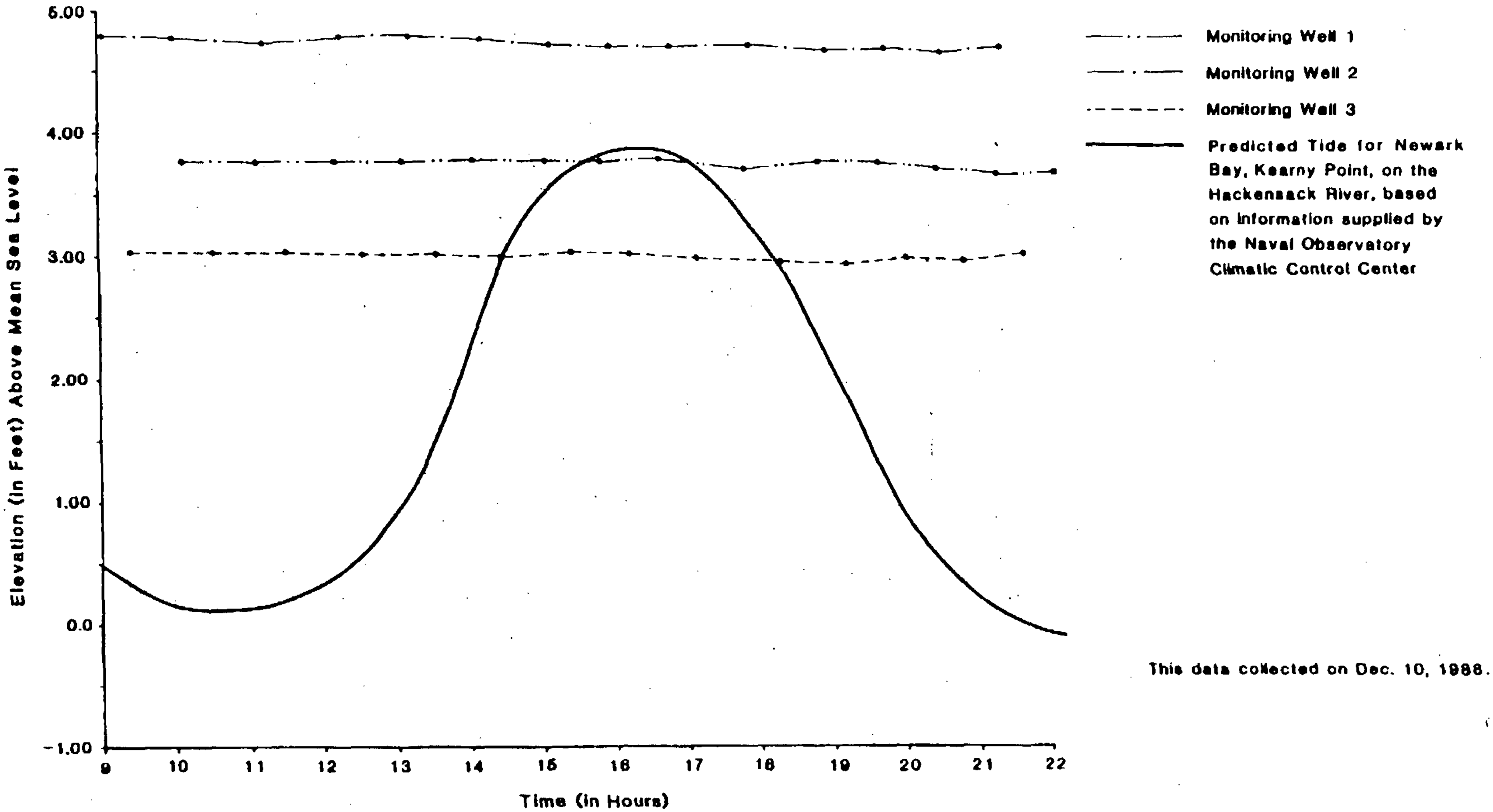
Figure 11



ENVIRON
Counsel in Health and Environmental Science

Tidal Variations in Monitoring Wells:
MW4, MW5, MW6, MW10 and MW11

Figure 12



AKH000385

ENVIRON

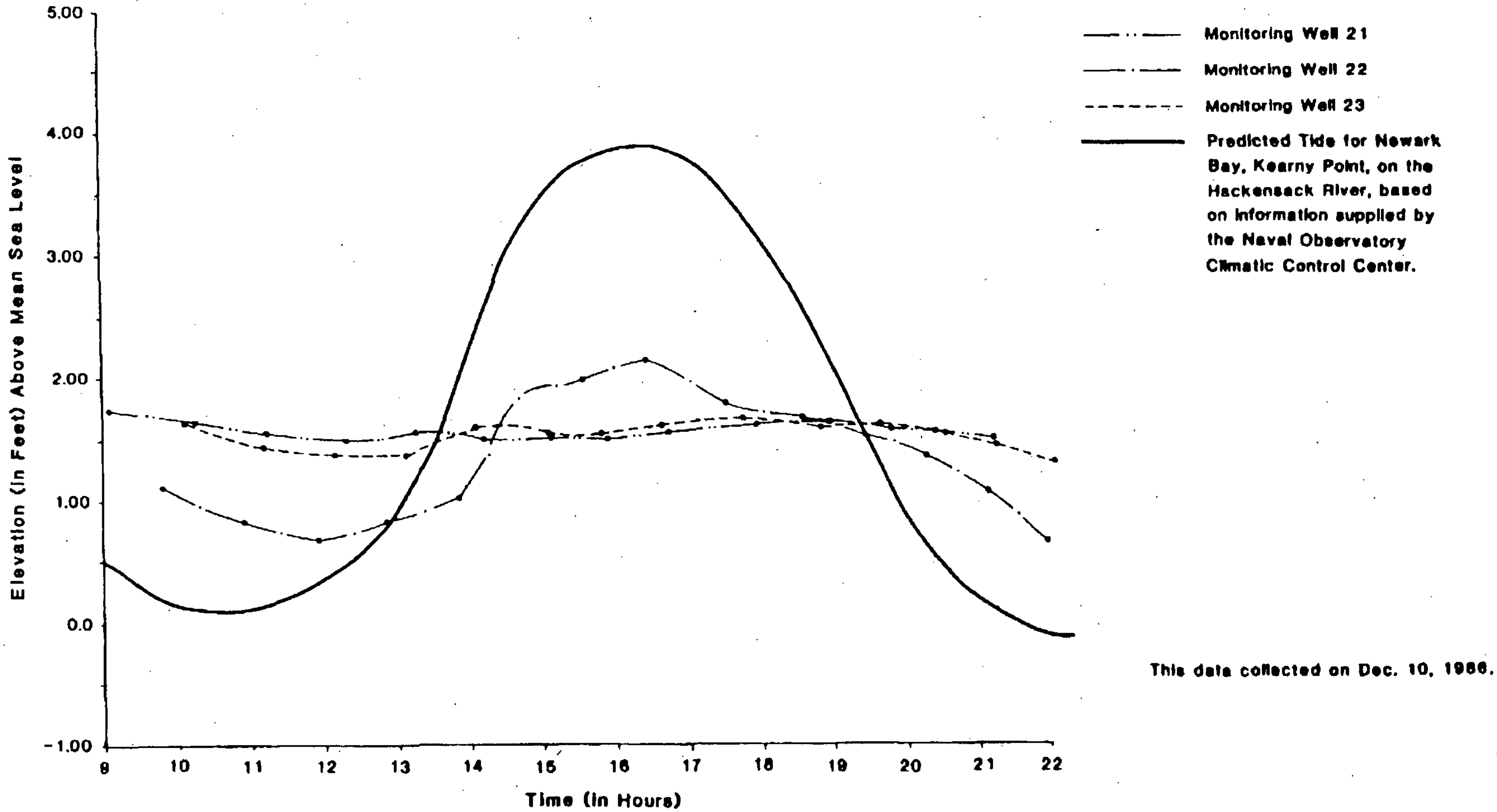
Counsel in Health and Environmental Science

Tital Variations in Monitoring Wells:
MW1, MW2 and MW3

Figure 13

945990189

FM 00529



AKH000386

ENVIRON
Counsel in Health and Environmental Science

Tidal Variations in Monitoring Wells: MW21, MW22 and MW23

Figure 14

The shallow wells which displayed tidal fluctuations are Monitoring Wells 4, 7, and 8. Monitoring Wells 7 and 8, which are less than 30 feet from the Bay, showed fluctuations in water levels of 1.96 and 2.05 feet, respectively. Monitoring Well 9, which is located approximately 90 feet from the Bay, displayed no tidal influence. The lack of tidal influence at this well may be due to either the distance from the Bay or a restriction of flow by the foundation of Building 14 between the well and the Bay. A theoretical analysis by ENVIRON on the extent of the potential tidal influence through the type of soil encountered at the site suggests that the tidal influence will not exceed a distance of 35 feet from the Bay.

Monitoring Well 4 is located approximately 350 feet from the Bay and also displays a fluctuation in water level corresponding to the change in tide. No other monitoring wells at this distance display tidal fluctuation. The observed response of Monitoring Well 4 is likely due to its proximity to the flume. During high tide, it appears that the flume is recharging the ground water regime in the immediate vicinity of the flume, apparently extending to MW4, but not to MW10 or MW5. This observation is based on water level data and levels of chloride detected in MW4. Nevertheless, with respect to the overall ground water regime at the site, the flume appears to act as a sink during both high and low tidal periods.

The only deep well which showed tidal influence was MW22. This deep well, which is located within 30 feet of the Bay, showed a fluctuation in water levels of 1.48 feet.

Chloride concentrations found in ground water samples taken from the shallow aquifer average 3,000 ppm in those wells experiencing tidal influence, including MW4, and 300 ppm in those wells not tidally influenced. This tends to support the premise that the flume recharges the shallow aquifer in its immediate vicinity at high tide. The chloride concentration in a sample taken from Newark Bay was 1,800 ppm at low tide, when the direction of flow within the Bay is from the rivers which flow into Newark Bay. The chloride concentration within the Bay thus would be expected to be lower at low tide than at high tide.

Chloride concentrations of ground water samples taken from the deep wells at the facility average 4,800 ppm. These concentrations are consistent with samples taken from other deep wells in the area. (Site Hydrogeologic Conditions, Kearny Works, AT&T Technologies, Inc.)

6. Interaction Between Shallow and Deep Aquifers

The water levels in the two upgradient deep wells, MW21 and MW23, are lower than the water levels in the adjacent shallow wells, thus indicating a likely vertical component of flow from the shallow aquifer to the deep aquifer in this portion of the site. The water levels throughout the tidal period in the downgradient deep well, MW22, are very close to the water levels in the adjacent shallow well MW8. Although this behavior may indicate that the two aquifers are in communication with each other in this portion of the site, it may instead be due to a defect in MW22. This is discussed further in Section VI.B.2. It appears that the semi-confining layer between the two aquifers limits the downward vertical migration between the shallow and deep aquifers in the western portion of the site. Further investigations are necessary, however, to determine if this is true for the eastern portion of the site as well.

IV. ANALYTICAL RESULTS

A. General

1. Analytical Data Packages

The analytical results received from Century Laboratories are provided with this report under separate cover. The laboratory data packages meet all Tier II requirements. The results of the analyses are tabulated by analytical parameter in Volumes III and IV of this report. Volume III includes all analytical results for soil and surface water samples. Volume IV includes all analytical results for ground water samples. Volume II includes the summary tables which are referred to in the discussion of the analytical results for each AEC.

2. Terminology

Each sample number contains information about where the sample was collected. For the sample number, 288E-1702-01, the prefix, 288E is an internal code number for this site. The middle four digits refer to the boring location, while the numbers after the hyphen indicate to the particular sample collected from the boring.

The analyses performed are referred to by abbreviations. These abbreviations are defined in Table 2. In the text, cyanide has been grouped with the priority pollutant metals for convenience.

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 2: Bureau of Industrial Site Evaluation Informal Cleanup Guidelines for Soil and Ground Water

Parameter	Soil	Ground Water
Total Petroleum Hydrocarbons (TPHC)	100 ppm	1,000 ppb
Priority Pollutants:		
Acid Extractables (AE)	Case-by-case	50 ppb
Base Neutrals (BN)	10 ppm	50 ppb
Pesticides	Case-by-case	Case-by-case
Polychlorinated Biphenyls (PCB)	1-5 ppm	0.001 ppb
Volatile Organics (VOC)	1 ppm	10 ppb
Phenol	Case-by-case	3,500 ppb
Cyanide	12 ppm	200 ppb
Priority Pollutant Metals (PPM)		
Antimony	2 ppm	--
Arsenic	20 ppm	50 ppb
Beryllium	400 ppm	--
Cadmium	3 ppm	10 ppb
Chromium	100 ppm	50 ppb
Copper	170 ppm	1,000 ppb
Lead	100 ppm	50 ppb
Nickel	100 ppm	--
Mercury	1 ppm	2 ppb
Selenium	4 ppm	10 ppb
Silver	5 ppm	50 ppb
Thallium	5 ppm	--
Zinc	350 ppm	5,000 ppb
Polycyclic Aromatic Hydrocarbons (PAH)	10 ppm	50 ppb

ppm: Parts per million (mg/kg)
ppb: Parts per billion (mg/l)
-- Indicates no cleanup level provided in NJAC 7:9-6.6

Note: The values in this table are informal cleanup guidelines used by the Bureau of Industrial Site Evaluation (BISE). They are compiled from BISE documents and from the levels set forth in NJAC 7:9-6.6.

In the tables summarizing the analytical results, "NT" indicates that the sample did not undergo a particular analysis. Compounds which were not detected in an analysis are indicated by a "BMDL" (below minimum detection limit). Occasionally, a target compound is identified even though it is present in a concentration below the minimum detection limit. Under these circumstances, an estimated concentration is given.

3. Cleanup Level Guidelines

As a preliminary basis for evaluating the levels of contaminants detected at this site, the Bureau of Industrial Site Evaluation (BISE) informal cleanup level guidelines have been used. These guideline levels are presented in Table 2. To correspond with these guidelines, the results of the soil analyses have been reported in parts per million (ppm) and the water analyses in parts per billion (ppb). Samples which were found to have contaminant concentrations greater than these cleanup levels are noted in the text. Although these cleanup levels are being used to perform a preliminary assessment of the results, neither ENVIRON nor Textron is suggesting that the BISE guidelines are a proper or appropriate basis for any later or final analysis of the results. Textron may choose to use a health and environmental risk analysis of compounds found at the site to determine an appropriate cleanup level.

B. Quality Assurance/Quality Control

1. Duplicate Samples

Fifty-one duplicate analyses were conducted and are reported in Volume II. The difference between the two duplicate values, calculated as a percentage of the smaller value, was less than 50 percent in 41 of the analyses. None of the duplicates differed by more than an order of magnitude. No analytical test showed consistently excessive variation between the results for duplicate samples.

2. Field Blanks

The analytical results of the field blanks collected during the drilling of the soil boring and monitoring wells are summarized in Volume II. Small concentrations of chloroform and toluene were detected in a few of the VOC+15 analyses. None of the concentrations exceeded 10 ppb. In one of the BN+10 analyses, 63 ppb of bis(2-ethylhexyl) phthalate were detected. In a few of the analyses low concentrations of zinc, lead and copper were detected.

Volume II summarizes the analytical results for field blanks collected during the sampling of the wells. In one of the BN+10 analyses, 6 ppb of bis(2-ethylhexyl) phthalate were detected. In two of the samples low concentrations of zinc were detected. In another sample, 5000 ppb of chloride was detected. The analytical results for the field blanks indicate that the field decontamination procedures were adequate and that sampling equipment did not significantly cross-contaminate the samples.

3. Trip Blanks

A total of 7 trip blanks were analyzed for VOC+15. The analytical results for these blanks are presented in Volume II. These analyses indicate that no significant cross-contamination of volatile organics occurred during sample storage or transport.

4. Laboratory Internal Blanks

The letter "B" following a value in the laboratory result sheets indicates that the chemical was also detected in the laboratory method blank analyzed for that set of samples. The purpose of this qualifier is to warn that the quantification of a chemical in a sample may have been affected by minor amounts of contamination in the analytical laboratory, as measured by the method blank. The State of New Jersey provides strict boundaries for method blank contamination.

Some samples in the volatile analysis were extracted with methanol. According to the laboratory, every attempt was made to utilize methanol with no background contamination. However, due to the holding time constraints for volatile analyses, the test was performed with contaminated methanol. The methanol utilized for the extraction contained low levels of a target compound (toluene) andseveral non-target compounds (acetone, 2-butanone, xylene). Century Laboratories received permission from Phil Sandine of NJDEP to use this methanol on the condition that the data for the contaminants was qualified by raising the detection limits to reflect concentrations of the contaminants in the methanol blank.

To correctly quantify the sample for method blank contamination, ENVIRON has subtracted the method blank value from the sample value. This correction is based on instrument measurements prior to calculation for sample dilution. For instance, a method blank concentration of 10 ppb acetone would be subtracted from a sample concentration of 30 ppb acetone, and the resultant sample value of 20 ppb would then be multiplied by a sample dilution factor, e.g., 4, to yield the final corrected value of 80 ppb acetone in the sample. ENVIRON has used the designation "C" to indicate sample concentrations which were corrected for method blank contamination.

C. Areas of Environmental Concern *

1. Area of Environmental Concern 1

AEC 1 is the loading area outside of Building 16 in which an apparent resin spill on a cracked pavement was observed. This AEC was sampled for volatile organics to determine if any of the

* See Plate 1 for the location of each Area of Environmental Concern.

solvents used in the area were present in the soil. Soil samples were collected from Boring 101 from two depths, 0.5 to 1.5 feet and 3.5 to 4.0 feet. Duplicate samples were collected from the upper depth. Volume II summarizes the analytical results for AEC 1.

Ethylbenzene and toluene were the only volatile organics detected in AEC 1. The concentrations of each of these compounds at each sampling depth is summarized in Volume II.

2. Area of Environmental Concern 2

AEC 2 is a small unpaved region around a dumpster and compactor which receive waste from Buildings 31 and 32. The soil in this AEC was tested for the presence of volatile organics. One soil boring, Boring 201, was placed in this AEC. A soil sample was collected from a depth of 0.5 to 1.5 feet. The total concentration of volatile organics detected in the sample was well below the BISE cleanup guideline. The analytical results are summarized in Volume II.

3. Area of Environmental Concern 3

AEC 3 is the area along the railroad tracks in which finished resin products may have spilled during railroad car loading. The samples collected from this area were analyzed for the presence of petroleum hydrocarbons and volatile organics. The analytical results are summarized in Volume II.

A soil sample was collected from a depth of 0.5 to 1.5 feet from each of three soil boring locations. Petroleum hydrocarbons and volatile organics were found to be present in concentrations greater than the BISE cleanup guidelines at each of these locations. The highest concentrations of TPHCs and VOCs were found at Borings 301 and 303.

The compounds detected in the volatile organics analysis were ethylbenzene and toluene. The concentrations in which these two contaminants were found at each location are summarized in Volume II. In each of the three samples, ethylbenzene was present in greater concentrations than toluene.

4. Area of Environmental Concern 4

AEC 4 is located along the railroad tracks outside of the large tank farm. In this area, non-hazardous fish and vegetable oils were unloaded from railroad cars into the large tank farm. The soil samples collected from this AEC were analyzed for petroleum hydrocarbons and volatile organics. The results of the TPHC and VOC+15 analyses are summarized in Volume II. In addition a GC "fingerprint" analysis has been performed on these samples in an attempt to determine if the oils present were fish and vegetable oils or petroleum based oils. When these results are received and have been interpreted they will be made available to the Department.

Soil samples were collected from the surface at each of the two boring locations. At Boring 401, a duplicate sample for volatile organics analysis was collected, and at Boring 402 a duplicate sample for total petroleum hydrocarbons was collected. At Boring 402, an additional soil sample was collected from a depth of 2.0 to 3.0 feet.

The concentrations of both petroleum hydrocarbons and volatile organics was found to be in excess of the BISE cleanup guidelines for each of the samples collected from this AEC. The samples from Boring 402 had concentrations of petroleum hydrocarbons and volatile organics that were less than those collected from Boring 401. In addition, there appeared to be a slight decrease in concentration with depth for both petroleum hydrocarbons and toluene, one of the volatile organics detected at Boring 402. Volume II summarizes the volatile organics found within AEC 4.

The two volatile organics detected within this AEC were, again, ethylbenzene and toluene. Ethylbenzene was present in greater concentrations than the toluene in each of the samples except the one collected from 0.0 to 0.5 feet from Boring 402.

5. Area of Environmental Concern 5

AEC 5 consists of the area at the end of the railroad tracks in which phthalic anhydride is loaded from the railroad cars into the tank farm. In this area, apparent spills of phthalic anhydride have been observed. Soil samples in this area were to be analyzed for phthalic anhydride. However, because no workable method for analyzing for this compound in soil could be found, the soil samples did not undergo this analysis. For a more complete discussion of this issue, see Section II. F.

6. Area of Environmental Concern 6

AEC 6 is an underground tank which was formerly used to store fuel oil. A soil sample was collected from Boring 601, located adjacent to the underground tank. Monitoring well 11 was placed further out from the tank to the depth of the invert of the tank. The soil sample was analyzed for TPHCs and PAHs. The water sample collected from MW11 was analyzed for petroleum hydrocarbons, volatile organics, base neutrals and acid extractables. The analytical results are summarized in Volume II.

Petroleum hydrocarbons were detected at a level slightly above the BISE cleanup guidelines in the soil sample. However, no petroleum hydrocarbons were detected in the water sample from MW11. The concentration of total volatile organics detected in MW11 exceeded the BISE cleanup guidelines. The major volatile organic detected was toluene (110 ppb) with some benzene (15 ppb) and ethylbenzene (8 ppb). The concentrations of PAHs detected in the soil and the base neutrals and acid extractables detected in the well water sample were below the BISE cleanup guidelines.

7. Area of Environmental Concern 7

AEC 7 is the area in which solvent tank trucks unload solvents into the large tank farm. During a portion of the period during which this practice took place, the area was unpaved. To determine if any solvents were present in the soils in this area, a soil sample was collected from a boring within AEC 7 and analyzed for VOC+15. In addition, MW8 was placed downgradient of and outside of this AEC. A soil sample was collected from MW8 from a depth of 1.0 to 2.0 feet and analyzed for VOC+15. The water sample collected from MW8 was also analyzed for VOC+15.

The soil sample collected from Boring 701 contained volatile organics in concentrations exceeding the BISE cleanup guideline. The soil sample collected from MW8, located outside of the AEC, contained volatile organics in concentrations well below the BISE cleanup guideline. In the water sample from MW8, no volatile organics were detected. These results are summarized on Volume II.

8. Area of Environmental Concern 8

AEC 8 consists of two tanks which were formerly used to store fuel oil. The tanks are only partially underground but are covered with earth above grade. Four soil borings were placed around these tanks to the depth of the invert of the tanks. Each of the samples was collected from the lower portion of the borings and was analyzed for petroleum hydrocarbons and PAHs. Duplicate samples were collected for TPHC analysis from Boring 802. The results of the analyses are summarized in Volume II.

At three of the four boring locations, petroleum hydrocarbons were detected in concentrations exceeding the BISE cleanup guidelines. The levels of TPHC's detected at boring 804 were within the BISE guidelines. The concentrations of petroleum hydrocarbons detected at Borings 801 and 803 were greater than those detected at Boring 802. The concentrations of PAHs detected at each of the boring locations were below the BISE cleanup guideline except for Boring 803. At Boring 804, no contaminants were detected in concentrations exceeding the BISE cleanup guidelines.

9. Area of Environmental Concern 9

AEC 9 is a small area beneath a former hole in the floor of Building 16. It was believed that raw materials and finished products from the polyester resin manufacturing may have spilled through this hole in the floor. Although sampling of the soil beneath this hole was proposed, a resinous material was encountered immediately below the bottom of the floor. Because this material could not be penetrated to reach the soil beneath it, the sample was collected from this material instead. Toluene was the only volatile organic detected.

10. Area of Environmental Concern 10

AEC 10 is a portion of the site which is currently used for drum storage of raw materials. Before this area was paved, it was used for the drum storage of finished products and raw materials. To determine if any soil or ground water contamination had occurred as a result of the drum storage in this area, a soil boring was placed within the AEC and a monitoring well was placed in the presumed downgradient direction from the AEC.

Soil samples were collected from Boring 1001 at a depth of 0.0 to 2.0 feet and 4.0 to 6.0 feet. Two soil samples were also collected from MW3, which is located outside of the AEC. The soil samples were collected at MW3 at 0.5 to 2.0 feet and 4.0 to 5.0 feet.

Each of the soil samples and the water sample from MW3 was analyzed for total petroleum hydrocarbons and volatile organics. The analytical results for the samples are summarized in Volume II.

Both the soil samples collected from within AEC 10 at Boring 1001 and those collected outside of AEC 10 from MW3 showed the presence of high concentrations of petroleum hydrocarbons. In both locations the concentration of petroleum hydrocarbon appeared to decrease with depth. However, no petroleum hydrocarbons were detected in the water sample from MW3. The concentrations of volatile organics in the soil samples collected from within AEC 10 and from MW3 were all well below the BISE cleanup guideline. No volatile organics were detected in water sample collected from MW3.

11. Area of Environmental Concern 11

AEC 11 is an area in which an above-ground storage tank was formerly located. The area was not paved during the period of time in which the storage tank was located in this AEC. Because a tank farm was constructed in this area after the removal of the above-ground storage tank, it was not possible to place a soil boring within this AEC. Instead, a monitoring well, MW5, was placed in the presumed downgradient direction from the AEC. A soil sample was collected from MW5 from a depth of 0.5 to 1.5 feet. The soil sample and the water sample collected from MW5 were analyzed for TPHC and VOC+15. The results are summarized in Volume II.

The soil sample contained petroleum hydrocarbons in a concentration greater than the BISE cleanup guideline. All of the other samples had concentrations of the target compounds which were either below the BISE cleanup guidelines or below the minimum detection limit.

12. Area of Environmental Concern 12

AEC 12 consists of the soil beneath Building 4. Because of evidence of apparent spills or discharges beneath this building which is built on stilts, samples from three soil borings were analyzed for total petroleum hydrocarbons and volatile organics. The results of these analyses are summarized on Volume II.

Significant concentrations of petroleum hydrocarbons and volatile organics were found at each of the boring locations. The concentrations of petroleum hydrocarbons were particularly high at Borings 1201 and 1202. The concentration of volatile organics detected at Boring 1202 was much higher than detected at Borings 1201 or 1203.

Ethylbenzene was the major volatile organic contaminant at each of the locations sampled. Toluene was also present in Borings 1201 and 1202. No other volatile organic compounds were detected in this AEC. Volume II gives a breakdown of volatile organics detected beneath building 4.

13. Area of Environmental Concern 13

AEC 13 is the area in which four large above-ground storage tanks were located when this portion of the site was unpaved. Three soil borings were placed within this AEC to determine if any soil contamination occurred as a result of the use of these tanks. One soil sample was collected from each of the three soil borings from a depth of 0.5 to 1.5 feet. Each of the samples was analyzed for petroleum hydrocarbons and volatile organics. The results of the analyses are summarized in Volume II.

Petroleum hydrocarbons were found to be present in concentrations greater than the BISE cleanup guidelines in each of the three boring locations. No volatile organics, however, were found in excess of the BISE cleanup guideline in any of the borings.

14. Area of Environmental Concern 14

AEC 14 is an area in which several above-ground storage tanks formerly stood. During the period of time during which these tanks were used, this area of the site was unpaved. Three soil borings were placed within this AEC and the soil samples collected were analyzed for petroleum hydrocarbons and volatile organics. From each of the three borings, a soil sample was collected from a depth of 0.5 to 1.5 feet. The results of the analyses performed on these samples are summarized in Volume II.

Petroleum hydrocarbons were found to be present in concentrations greater than the BISE cleanup guideline at two of the boring locations, Borings 1401 and 1402. At Boring 1403, no petroleum hydrocarbons were detected. Volatile organics were found in each of the boring locations in excess of the BISE cleanup guidelines. The concentrations of both petroleum hydrocarbons and volatile organics ranged from less than 42 ppm to 8,040 ppm, and from 8 ppm to 1,245 ppm, respectively.

The concentrations of the different volatile organics detected within AEC 14 are summarized in Volume II. The two volatile organics detected in each of the borings were ethylbenzene and toluene. Although the total concentrations of volatile organics varied significantly among the three samples, the concentrations of ethylbenzene and toluene varied consistently with each other (i.e., the highest concentration of ethylbenzene coincided with the highest concentration of toluene and vice versa).

15. Area of Environmental Concern 15

AEC 15 is an area of the site formerly used for drum storage at a time when the area was unpaved. Three soil borings were placed in this AEC and a sample was collected from each at a depth of 0.5 to 1.5 feet. Each of the samples underwent a TPHC and VOC+15 analysis. The results of these analyses are summarized in Volume II.

Petroleum hydrocarbons were found in concentrations greater than the BISE cleanup guideline in two of the soil borings, Borings 1501 and 1504. The concentrations of volatile organics in these two borings, however, were well below the BISE cleanup guidelines. At Boring 1503, the concentration of total organics was slightly above the BISE cleanup guidelines.

16. Area of Environmental Concern 16

AEC 16 is a former drum storage area which was unpaved during the period of its use. Three soil borings were placed within AEC 16 and one soil sample was collected from each soil boring. Each soil sample was collected from a depth of 1.0 to 1.5 feet. The samples collected were analyzed for petroleum hydrocarbons and volatile organics. The results of the analyses are summarized in Volume II.

The concentrations of petroleum hydrocarbons and volatile organics for each of the samples were in excess of the BISE cleanup guidelines. The highest concentrations of both petroleum hydrocarbons and volatile organics were found at boring 1603.

The compounds detected in the volatile organic analysis are summarized in Volume II. Ethylbenzene and toluene were, again, the only contaminants detected in the volatile organic analysis. Ethylbenzene appears to be the primary volatile organic contaminant in this AEC. Toluene was not detected at either Boring 1601 or 1602. At Boring 1603, where the highest concentration of ethylbenzene was detected, toluene was also detected.

17. Area of Environmental Concern 17

AEC 17 is another area in which drums formerly were stored during a period when that portion of the site was not paved. A soil sample to a depth of 1.5 feet was collected from each of the three borings placed within this AEC. In addition, a monitoring well, MW10, was placed within this AEC. Soil samples were collected from MW10 from a depth of 0.5 to 1.5 feet and 4.0 to 4.5 feet. The soil samples collected from the three borings were analyzed for petroleum hydrocarbons and volatile organics. The soil samples collected from MW10 and the water sample collected from MW10 were analyzed for petroleum hydrocarbons, volatile organics, base neutrals and acid extractables.

Volume II summarizes the analytical results for the samples collected from this AEC. Petroleum hydrocarbons were detected in concentrations greater than the BISE cleanup guidelines in two of the three borings (1701 and 1702) and in both of the soil samples collected from MW10. Low concentrations of volatile organics were detected in the three boring locations, but at MW10 concentrations greater than the BISE cleanup guideline were detected. Significant concentrations of base neutrals were also found in the soil samples for MW10. No acid extractables were detected. The concentrations of both volatile organics and the base neutrals appeared to decrease with depth in the soil samples from MW10. In the water sample from MW10, only the volatile organics were present in concentrations greater than the BISE cleanup guidelines.

Volume II summarizes the concentrations of the volatile organics detected. Again, ethylbenzene and toluene were the only volatile organics detected within this AEC. In both the soil samples and the water sample collected from MW10, toluene was present in significantly higher concentrations than was ethylbenzene. In each of these three samples, the concentration of toluene was approximately one order of magnitude greater than the concentration of ethylbenzene.

18. Area of Environmental Concern 18

AEC 18 is an area in which fuel oil is unloaded into a large tank located in Building 12. In this area, which is unpaved, there is evidence of apparent spills. A soil sample was collected from a depth of 1.0 to 1.5 feet from Boring 1801 and analyzed for total petroleum hydrocarbons. The concentration of petroleum hydrocarbons detected is in excess of the BISE cleanup guideline.

19. Area of Environmental Concern 19

AEC 19 is the area within the dike around Tank 300. Tank 300 previously was used to store waste resin solution (1285 Premix). Although there is a concrete pad beneath Tank 300, the entire area within the dike is unpaved and apparent spills have been observed within this area.

One soil boring was placed within this AEC. Soil samples were collected from a depth of 0.5 to 1.5 feet and 2.0 to 2.5 feet, and were analyzed for petroleum hydrocarbons and volatile organics. Concentrations of both these parameters were found at both depths in concentrations which exceed the BISE cleanup guidelines. The concentrations of both the petroleum hydrocarbons and the volatile organics appear to increase with depth. The analytical results are summarized in Volume II.

Volume II summarizes the concentrations of the volatile organics detected within AEC 19. Ethylbenzene and toluene once again are the only volatile organics detected. Ethylbenzene is present in higher concentrations than toluene in both samples. The concentrations of both compounds increase significantly with depth.

20. Area of Environmental Concern 20

AEC 20 is the area in which an underground gasoline tank formerly was located. A monitoring well, MW9, was placed just outside of this AEC. Two soil samples were collected from this monitoring well, one from 0.0 to 2.0 feet and the other from 2.0 to 4.0 feet. The soil samples underwent TPHC and PP+30 analyses. The result of the analysis are summarized in Volume II.

In the soil samples collected from both depths, TPHCs and base neutrals were found to be present in concentrations greater than the BISE cleanup guidelines. In addition, two metals (lead and zinc) detected in the upper soil sample and five metals (cadmium, copper, lead, mercury, and zinc) detected in the lower soil sample were found to be present in concentrations greater than the BISE cleanup guidelines.

The compounds detected in the base neutral analysis are not included in this table. Although nine base neutral compounds were detected, the primary contaminant was di-n-butylphthalate. This compound was present in a concentration of 22 ppm in the upper soil sample and 15 ppm in the lower soil sample. The other eight constituents were found to be present in concentrations of less than 2 ppm.

The concentrations of all five of the metals increased with depth. The most significant increase was for mercury which varied from a concentration of 0.066 ppm in the upper soil sample to 5.66 ppm in the lower soil sample.

The water samples collected from MW9 were tested for total petroleum hydrocarbons, volatile organics, methyl tertiary butyl ether (MTBE), diisopropyl ether (DIPE), tertiary butyl alcohol (TBA), methanol, and lead. Duplicate water samples were collected for each of the analyses except the volatile organics analyses. The results of the analyses are summarized in Volume II.

No petroleum hydrocarbons were detected in the water samples. No analysis was performed for base neutrals. The water sample was tested for only one metal. Lead was found to be present in a concentration greater than the BISE cleanup guideline.

21. Area of Environmental Concern 21

AEC 21 is the area in which an above-ground tank farm formerly was located. The tank farm was in use while this portion of the site was unpaved. Three soil borings were placed within this AEC with one soil sample collected from each boring from a depth down to 1.5 feet. Each of the samples collected underwent a TPHC and VOC+15 analysis. The results of the analyses are summarized in Volume II.

Each of the samples collected were found to exceed the BISE cleanup guidelines for total petroleum hydrocarbons and volatile organics. The highest concentration in both categories of contaminants were found at Boring 2101. The concentration of volatile organics detected at Boring 2102 was significantly less than that detected at Borings 2101 and 2103. Boring 2102 is located near the border of AEC 21.

The concentrations of the volatile organic contaminants are summarized in Volume II. Again, the only volatile organic contaminants detected were ethylbenzene and toluene. In all three locations, ethylbenzene was present in concentrations greater than toluene.

22. <u>Area of Environmental Concern 22</u>

AEC 22 is a concrete pad on which 1285 Premix (a hazardous waste generated at the facility) was stored in drums. Initially, ENVIRON proposed to collect a soil sample from the dirt on top of the pad. As described in Section II.F, the dirt on top of the pad was swept up and placed in a large dirt pile beside the pad. Therefore, the sample was taken from this dirt pile. The sample collected underwent a TPHC and VOC+15 analysis.

The analytical results are set forth in Volume II. The concentrations of the TPHCs and the volatile organics both exceeded the BISE cleanup guidelines. The primary volatile organic detected was toluene. In addition, chloroform and ethylbenzene were also detected.

23. Area of Environmental Concern 23

AEC 23 is the tank wagon loading area outside of Building 4 where 1285 Premix may have been generated. The pavement in this area is cracked. One boring was placed within this AEC and two samples were collected, from 0.1 to 1.5 feet and 2.0 to 2.5 feet in depth. The soil samples were analyzed for petroleum hydrocarbon and volatile organics. The analytical results for these samples are summarized in Volume II.

Petroleum hydrocarbons were detected in concentrations greater the BISE cleanup guideline in both soil samples. The concentration of petroleum hydrocarbons appears to decrease with depth. For the volatile organics, only the lower sample contained total VOCs in concentrations exceeding the BISE cleanup guidelines. The concentration of volatile organics appears to increase with depth.

The concentrations of the contaminants detected in the volatile organics analysis are summarized in Volume II. Again, the only two volatile organic compounds detected were ethylbenzene and toluene.

In both of the samples ethylbenzene was present in concentrations greater than toluene.

24. Area of Environmental Concern 25*

AEC 25 is the tank wagon loading area outside of Building 26 in which 1285 Premix may have been generated. The pavement in this area is cracked. A soil boring was placed within this AEC and one soil sample was collected from a depth of 0.5 to 1.5 feet. The sample was analyzed for petroleum hydrocarbons and volatile organics. The TPHC concentration and the VOC+15 concentration both exceed the BISE cleanup guidelines. For the volatiles, toluene was the only compound detected. The results are summarized in Volume II.

25. Area of Environmental Concern 26

AEC 26 consists of the drains in the large tank farm which in the past discharged directly to the ground. As explained in Section II.F, those drains are now plugged; thus, it was not possible to sample this AEC.

* There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

26. Area of Environmental Concern 27

AEC 27 is an area in which empty drums were observed during the April 9, 1986, NJDEP site inspection. A soil boring was placed in this AEC and a sample was collected from a depth of 1.0 to 1.5 feet. The soil sample underwent a TPHC and VOC+15 analyses. In both of these analyses, no contaminants were found.

27. Area of Environmental Concern 28

AEC 28 is the area around a break in a pipe which carries runoff from the northern railroad siding. A soil boring was placed within this AEC and a sample was collected from a depth of 1.0 to 1.5 feet. The sample underwent TPHC and VOC+15 analyses. Petroleum hydrocarbons were found to be present in a concentration slightly greater than the BISE cleanup guideline. No volatile organic compounds were detected.

D. Shallow Wells

1. Monitoring Well 1

MW1 was placed in the northwest corner of the site to monitor the quality of the ground water entering the site. Duplicate soil samples were collected from a depth of 1.5 to 2.5 feet from this well. The samples were analyzed for TPHCs and PP+30. The water samples collected from the well were analyzed for the same parameters. The analytical results for the samples collected from MW1 are summarized in Volume II.

The only compound found to be present in concentrations exceeding the BISE cleanup guideline was petroleum hydrocarbons in the soil. The analytical results for all of the other samples collected from this well were either below the minimum detection limit or below the BISE cleanup guidelines.

2. Monitoring Well 2

MW2 was placed in the southwest corner of the site to monitor the quality of the water entering the property at that point. No soil samples were collected from this monitoring well, although soil samples were collected from the deep well in this well cluster, MW21. The water samples collected from MW2 were analyzed for petroleum hydrocarbons and volatile organics. Petroleum hydrocarbons were found to be present in this well in a concentration of 70,000 ppb, however, no volatile organics were detected.

3. Monitoring Well 3

MW3 was placed in the presumed down gradient direction from AEC 10, to monitor the water quality of the ground water downgradient of

AEC 10. The analytical results for MW3 are included in the discussion of AEC 10. which can be found in Section IV.C.10.

4. Monitoring Well 4

MW4 was placed near the middle of the site to monitor the quality of the ground water as it travels through the site. It is located approximately 25 feet south of the underground flume. Two soil samples were collected from this monitoring well, from 0.5 to 1.0 feet and from 3.0 to 3.5 feet in depth. Both the soil sample and the water samples collected from this well underwent a volatile organics analysis. The analytical results for MW4 are summarized in Volume II. None of the samples was found to contain concentrations of volatile organics which exceed the BISE cleanup guidelines.

5. Monitoring Well 5

MW5 was placed in the presumed downgradient direction from AEC 11 to monitor potential ground water contamination from this AEC. The analytical results for this monitoring well are included in the discussion of AEC 11 which can be found in Section IV.C.II.

6. Monitoring Well 6

MW6 was placed along the southern border of the property to monitor the quality of shallow ground water entering the site at that point. Two soil samples were collected from the monitoring well, at depths of 1.0 to 2.0 feet and from 6.0 to 7.0 feet. In addition, duplicate water samples were collected from this well. All the samples collected underwent TPHC and PP+30 analyses. The results of the analyses are summarized in Volume II.

Petroleum hydrocarbons were found in both of the soil samples in concentrations which exceed the BISE cleanup guidelines. The water samples, however, showed no presence of petroleum hydrocarbons. The total volatile organics in the soil also exceeded the BISE cleanup guidelines. In one of the duplicate water samples, no volatile organics were detected, while in the other 28 ppb were detected. For the base neutrals, the lower soil sample was found to have concentrations greater than the BISE cleanup guidelines, whereas the upper sample did not. The base neutrals detected in the water samples were below the BISE guidelines. Up to four metals were found to be present in concentrations greater than the BISE cleanup guidelines in the soil. In the water samples, one duplicate sample indicated that two metals exceeded the BISE guidelines while the other duplicate indicated that the concentration of only one metal exceeded the BISE guideline.

Volume II summarizes the concentrations of the contaminants detected above the BISE cleanup guidelines. Three volatile organics were detected in the analysis. These were chloroform, ethylbenzene, and toluene. Toluene was present in the greatest concentration of all the volatiles in the soil samples and was the only volatile organic detected in the water samples.

The four metals which were detected in concentrations above the BISE guidelines in the lower soil sample are cadmium, copper, lead and zinc. Cadmium was present above the BISE cleanup guideline for soil in the lower soil sample only. One of the duplicate water samples contained a concentration of 11 ppb of cadmium (the BISE cleanup guideline is 10 ppb) and the other duplicate contained 7.5 ppb. For copper, the only sample which exceeded the BISE guidelines was the lower soil sample. Lead was the only metal found to exceed the BISE guidelines in all four of the samples. Zinc was found to exceed the BISE cleanup guidelines in the soil samples, but the concentrations detected in the water samples were well below the BISE cleanup guideline. The concentrations of each of these four metals increased with depth between the two soil samples collected.

Fourteen compounds were found in the base neutral analyses performed on the two soil samples. The concentrations detected ranged from non-detect to 22 ppm. None of the base neutral compounds detected in the soil samples were detected in the water samples. However, another base neutral compound, bis(2-ethylhexyl) phthalate was detected in low concentrations in the water samples.

7. Monitoring Well 7

MW7 was placed in the northeast corner of the property to monitor the quality of the shallow ground water in this presumed downgradient portion of the site. Two soil samples were collected from this monitoring well from depths of 0.5 to 1.5 feet and 4.0 to 6.0 feet. Both the soil samples and the water sample collected from this well underwent analysis for petroleum hydrocarbons and volatile organics. The results of these analyses are summarized in Volume II.

Petroleum hydrocarbons were found to be present in concentrations exceeding the BISE guidelines in both of the soil samples. No petroleum hydrocarbons, however, were detected in the water sample. The concentrations of volatile organics in the soil samples were very low. The concentration detected in the deeper soil sample just exceeded the BISE cleanup guideline of 1 ppm. The concentration of volatile organics detected in the water sample, however, significantly exceeds the BISE cleanup guideline.

The concentrations of the volatile organics detected are summarized in Volume II. Ethylbenzene and toluene were the only volatile organics detected. In all three samples, the toluene was present in significantly greater concentrations than the ethylbenzene.

8. Monitoring Well 8

MW8 is part of the deep well/shallow well cluster located on the presumed downgradient portion of the site. MW8 was placed in this location to monitor the shallow ground water near AEC 7. The results of the analyses performed on the samples collected from this well are summarized in the discussion of AEC 7. This can be found in Section IV.C.7.

9. Monitoring Well 9

MW9 was placed in the southeast portion of the site in the area in which an underground gasoline tank had been located. It was placed in this location to monitor the potential effects of the underground gasoline tank on the soil and shallow ground water in AEC 20. The analytical results of the samples collected from MW9 are included in the discussion of AEC 20. This discussion can be found in Section IV.C.20.

10. Monitoring Well 10

MW10 is located within AEC 17 to monitor the effect of the former practices in this area on the soil and shallow ground water. The results of the analyses for this well are included in the discussion of AEC 17 and can be found in Section IV.C.17.

11. Monitoring Well 11

MW11 was placed near the underground fuel oil tank comprising AEC 6. The analytical results for this monitoring well are included in the discussion of AEC 6. This discussion can be found in Section IV.C.6.

12. Summary of Shallow Well Analytical Results

Volume II summarizes the analytical results of the water samples collected from each of the shallow wells. Only three of the parameters for which these wells were tested were found to have concentrations which exceeded the BISE cleanup guidelines. These parameters were total petroleum hydrocarbons, total volatile organics, and two of the priority pollutant metals.

Petroleum hydrocarbons were detected in only one of the shallow wells, MW2. The concentration detected in this well, however, significantly exceeded the BISE cleanup guideline of 1,000 ppb.

Volatile organics were detected in only four of the shallow wells. In each of these wells, the total concentration of volatiles exceeded the BISE cleanup guideline of 10 ppb. The concentration of total volatiles detected in MW10 was considerably greater than the concentrations detected in MW6, MW7, and MW11. In each of these four monitoring wells, the only volatile organics detected were toluene and ethylbenzene, except for MW11 in which a low level of benzene was detected as well. In each of these four shallow wells, toluene was the volatile organic detected in the greatest concentration.

Only two of the shallow wells were analyzed for the presence of metals. MW6 was analyzed for the presence of all of the priority pollutant metals, while MW9 was monitored only for the presence of lead. Lead was found to be present in concentrations greater than the BISE cleanup guidelines in both wells. In the duplicate samples collected from MW6, the concentration of cadmium just exceeded the BISE level in one duplicate and was below the BISE guideline in the other.

E. Deep Wells

1. Monitoring Well 21

MW21 was placed in a deep well/shallow well cluster with MW2 in the southwest corner of the site. Two soil samples were collected from this monitoring well, one from 0.5 to 1.5 feet and the other from 31.0 to 32.0 feet. The deeper soil sample was collected from the bottom of the confining layer immediately above the deep aquifer. Both of the soil samples and the water sample collected from MW21 underwent a TPHC and PP+30 analysis. The results of these analyses are summarized in Volume II.

The only parameters which were found to be present in concentrations exceeding the BISE cleanup guidelines were in the shallow soil sample. The parameters which exceed the acceptable levels in this sample are total petroleum hydrocarbons and two metals, copper and lead.

2. Monitoring Well 22

MW22 is the deep well of the deep well/shallow well cluster located near Newark Bay. Two soil samples were collected from this well, one from 2.0 to 4.0 feet and the other from 27.0 to 27.5 feet in depth. The deeper soil sample was collected from the bottom of the confining layer, immediately above the deep aquifer. The well was sampled on two dates, December 18 and December 31, 1986. All of the soil and water samples were analyzed for volatile organics. In addition, the deeper soil sample was analyzed for total petroleum hydrocarbons. The results of these analyses are summarized in Volume II.

Volatile organics were detected in concentrations exceeding the BISE cleanup guidelines in the surface soil samples. Neither petroleum hydrocarbons nor volatile organics were detected in the lower soil sample. In the water samples, volatile organics were also detected in concentrations exceeding the BISE cleanup guidelines.

The concentrations of the volatile organics detected are summarized in Volume II. In the upper soil sample, three volatile organics were detected. These compounds are chloroform, ethylbenzene and toluene. Toluene was the volatile organic present in the greatest concentration in this soil sample. For the water samples from MW22, only two volatile organics (ethylbenzene and toluene) were detected. In both of the water samples collected from this well, ethylbenzene was present in a significantly greater concentration than toluene.

3. Monitoring Well 23

MW23 is the deep well in the deep well/shallow well cluster in the upgradient northwest corner of the site. Three soil samples were collected from this well. The samples were collected from depths of 0.5 to 1.0 feet, 2.0 to 3.0 feet, and 23.0 to 24.0 feet. The second soil sample was collected immediately above the water table. The deepest sample was collected from the bottom of the confining layer, immediately above the deep aquifer. These three soil samples and the water sample collected from MW23 were analyzed for petroleum hydrocarbons and priority pollutants, with the exception of the VOC+15 portion of the PP+30 analysis for MW23-03 which was not analyzed by the laboratory. The results of the analyses performed on these samples are summarized in Volume II.

Total bse neutrals were found to exceed the BISE cleanup level in the soil sample collected from immediately above the water table. Fifteen base neutral compounds were found to be present in this analysis. Arsenic was found in both of the upper soil samples in concentrations just exceeding the BISE guidelines.

4. Summary of Deep Well Analytical Results

Volume II summarizes the analytical results for the water samples collected from each of the deep wells. Only the volatile organics analysis for MW 22 found any compounds in concentrations greater than the BISE cleanup guidelines. No compounds were detected in concentrations in excess of BISE guidelines in either MW21 or MW23.

F. Underground Flume

A sediment sample and a water sample were collected at the inflow of the underground flume, at the point at which Plum's Creek goes underground. Another water sample was collected from the outfall of the underground flume, at the point at which the underground flume discharges into Newark Bay. No sediment was present at the discharge point to be analyzed. Each of the samples collected was analyzed for total petroleum hydrocarbons and priority pollutants plus a forward library search. The results of the analyses in are summarized Volume II.

In the sediment sample, petroleum hydrocarbons were detected in a concentration just above the BISE cleanup guideline of 100 ppm. In the two water samples, no petroleum hydrocarbons were detected. The concentration of volatile organics detected in the sediment sample was well below the BISE cleanup guidelines.* However, for the two water samples, the total volatile organics exceeded the BISE cleanup guidelines. The concentrations of base neutrals detected in the sediment samples were slightly above the BISE cleanup guidelines level of 10 ppm. The concentrations of base neutrals detected in the water samples were within the BISE guidelines. Six priority pollutant metals were detected in concentrations exceeding the BISE guidelines in the sediment sample. Only two of these priority pollutant metals were detected above BISE levels in each of the two water samples.

---

* Although the BISE cleanup guidelines do not directly apply to the water traveling through the underground flume, they are used here as a reference in this preliminary evaluation of the data.

The concentrations of each of the contaminants detected are presented in Volume II. Seven volatile organics were detected in these three samples. In the sediment sample, the only volatile organics detected were chlorobenzene and toluene. In each of the two water samples, six volatile organics were detected in very similar concentrations. A seventh compound, ethylbenzene, which was not detected in the sample collected from the inflow to the underground flume, was found to be present at the outfall in a concentration of 220 ppb.

Only two of the six metals found in concentrations greater than the BISE cleanup guideline in the sediment sample were detected in the water samples. These two metals are cadmium and lead. As with the concentrations of volatile organics, the concentrations of these two metals in the two water samples are virtually identical.

V. DYE TEST RESULTS

Dye tests were performed on two dates on the floor drains inside Building 26 to determine if these floor drains empty into the storm sewer which travels along the north side of this building. Because of the highly volatile nature of some of the chemicals used at the facility, smoke testing could not be used to investigate these floor drains. Dye tests were performed on these drains on two dates, November 13, 1986 and January 28, 1987. On both occasions, uranine was flushed down the drains with ample quantities of water and the storm drain outside of Building 15 was observed for 2.5 hours and 2 hours, respectively. On neither of the two occasions was any of the green dye observed in the storm sewer.

VI. DISCUSSION

A. Shallow Aquifer and Fill Unit

1. General

Soil samples from the fill unit in which the shallow aquifer lies indicate the presence of petroleum hydrocarbons, volatile organics, base neutrals, and a few of the priority pollutant metals in concentrations which exceed the BISE cleanup guidelines. Water samples collected from the shallow aquifer indicate that petroleum hydrocarbons, volatile organics, and lead are present in some of the shallow wells in concentrations greater than the BISE guidelines. No other contaminants were found to be present. A discussion of each of the above parameters is presented below.

2. Total Petroleum Hydrocarbons

Plate 4 gives the concentrations of petroleum hydrocarbons detected above BISE cleanup guidelines within the top 2 feet of soil throughout the site. The concentrations of petroleum hydrocarbons detected in the soil samples varied considerably throughout the site. The highest concentrations were found in AEC 12 (under Building 4), in AECs 3 and 4 (along the railroad tracks), AEC 8 (around two "underground" fuel oil tanks), in and around AEC 10 (a former drum storage area), and within AEC 21 (a former tank farm). Significant concentrations were also found in AECs 14, 16, 19, and 23.

While some of the high concentrations of petroleum hydrocarbons appear to be related to certain AECs, there also appears to be a significant variation in the background levels around the site. Each of the monitoring wells except MW10 was placed in an area in which there was no evidence to suggest that previous activities associated with petroleum hydrocarbons had taken place. The levels of TPHCs detected in the soil samples collected from these wells, however, varied from 39 ppm to 16,000 ppm.

No petroleum hydrocarbons were detected in any of the shallow wells except for MW2, one of the upgradient wells. As the piezometric maps indicate, the ground water in this area of the site flows from off-site toward this monitoring well. It is believed that the significant petroleum hydrocarbon contamination detected in this well is due to an upgradient off-site source.

3. Volatile Organics

Plate 5 gives the concentrations of total volatile organics detected above the BISE cleanup guidelines within the top 2 feet of soil throughout the site. Two volatile organics, ethylbenzene and toluene, were found to be present in relatively high concentrations in several areas of the site. In general, the two compounds were found together. Plate 6 gives the concentrations of ethylbenzene and Plate 7 gives the concentration of toluene in the top 2 feet of soil. The highest concentrations were found in AECs 3 and 4 (along the railroad tracks), AEC 12 (under building 4), in the portion of AEC 17 around MW10 (a former drum storage area), and in AEC 21 (a former tank farm). Significant concentrations were also observed in AECs 1, 7, 14, a portion of AEC 15, AEC 16, and AEC 19.

The analyses of numerous other soil samples around the site indicate that the soil contamination by these two volatile organics is confined to the AECs mentioned above. The concentrations of volatile organics detected in the lower soil samples collected from MW6 and MW7, which are not located within any AEC, exceed the BISE cleanup levels. However, both of these samples were collected from below the water table.

In the water samples collected from the shallow wells, toluene appeared in significant concentrations in four of the wells. The concentrations of the total volatile organics detected in each of these four wells are shown on Figure 15. These shallow wells were MW6, MW7, MW10, and MW11. Relatively high concentrations of toluene were detected at MW10. MW10 was also the only shallow well in which ethylbenzene was found to be present in a significant concentration. MW10, which is the only shallow well located within an AEC, also had very high concentrations of these two volatile organics in both of the soil samples collected from this well. Similar to the water sample collected from MW10, toluene was present in much higher concentrations than ethylbenzene in both of the soil samples. Thus, it appears that the volatile organic contamination present in the ground water at MW10 is due to activities in this area which have also contaminated the soil.

4. Base Neutrals

Total base neutrals were detected in concentrations which exceed the BISE guidelines in a few soil samples. In each of these samples a broad range of base neutrals (as many as 15 compounds) were detected. Although the total concentrations of base neutrals in these samples exceeded the BISE guidelines, in general the concentration of each of the individual compounds was relatively low. For this reason, only the total concentrations of the base neutrals are discussed.

Base neutrals were found to be present in significant concentrations in the soil samples collected from MW10, which is located within AEC 17. Concentrations in excess of BISE cleanup guidelines were found in the soils collected from MW9 and MW23 as well. The source of the base neutrals at these three shallow well locations has not been determined. Their presence may be related to the fill material.

Total base neutrals were detected in a concentration greater than the BISE guideline in one of the soil samples collected from AEC 8, around the two "underground" fuel oil tanks. The base neutral contamination at this location appears to be related to the petroleum hydrocarbon contamination also detected in this area. The sample in which the high levels of base neutrals were detected was also the sample in which one of the highest concentrations of petroleum hydrocarbons in this AEC was detected.

None of the water samples collected from the shallow wells contained base neutrals in concentrations exceeding the BISE cleanup guidelines. Each of the four shallow wells in which base neutral contamination had been detected in the soil were sampled and were not found to have base neutral contamination in the ground water.

5. Priority Pollutant Metals

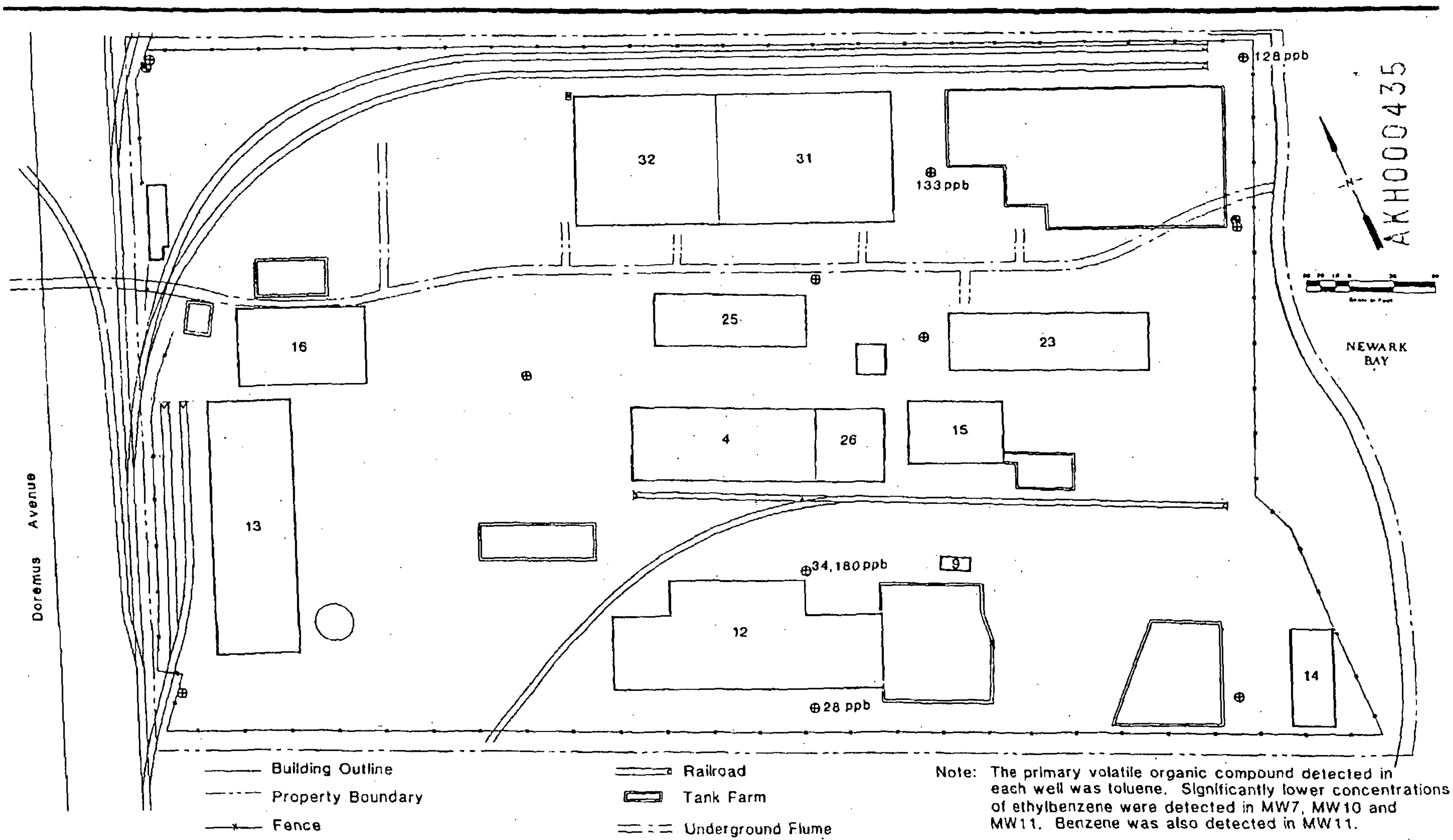
Soil samples were analyzed for the priority pollutant metals at five locations. These five locations are MW1, MW21, MW6, MW9 and MW23. Arsenic and mercury were found to be present in concentrations exceeding the BISE cleanup guidelines in only one location. Copper, lead, and zinc were found in two or more locations.

The arsenic contamination above the BISE guideline was detected only in the samples collected from MW23. This concentration is slightly above the BISE guideline. In the soil samples collected from MW1, however, which is located within a few feet of MW23, arsenic was detected in concentrations below the BISE guideline. These anomalous results suggest that the presence of arsenic is associated with the fill.

Mercury was found to be present in a concentration exceeding the BISE guideline in one of two soil samples collected from MW9. In the sample collected from 0 to 2 feet, 66 ppm of mercury was detected. In the sample collected immediately below this, from a depth of 2 to 4 feet, a concentration of 5,660 ppm were detected. This large difference in the concentrations detected at these two depths suggests that the source of the mercury is the fill. Had the presence of mercury been a result of activities at the site, a gradual decrease in concentration along the vertical profile would be expected.

Copper, lead and zinc were detected in concentrations greater than the BISE guidelines in the soil samples collected from MW6 and from MW9. The concentrations of each of these three metals increased with depth at each of these monitoring well locations. High concentrations of copper and lead were also found in the soil sample collected from MW21. Again, because of the increasing concentrations of these metals with depth, it is likely that this presence is related to the fill material rather than being a result of activities at the site.

Water samples from only two of the shallow wells were analyzed for metals. MW6 was analyzed for all of the priority pollutant metals, but MW9 was analyzed only for lead. Lead was found to be present in concentrations exceeding the BISE guidelines in both of these wells. The lead detected in the ground water may be due to



Note: The primary volatile organic compound detected in each well was toluene. Significantly lower concentrations of ethylbenzene were detected in MW7, MW10 and MW11. Benzene was also detected in MW11.

Figure 15 CONCENTRATIONS OF TOTAL VOLATILE ORGANIC COMPOUNDS IN SHALLOW AQUIFER

ENVIRON
Counsel in Health and Environmental Science

the lead present in the soil or may originate from the Sun Oil property which is directly upgradient of these monitoring wells.

B. Deep Aquifer

1. General

From each of the three deep wells, a soil sample was collected from the bottom of the confining layer immediately above the deep aquifer. The samples collected from MW21 and MW23 underwent a TPHC and PP+30 analysis. The soil sample collected from MW22 underwent a volatile organics analysis. No contamination was detected in any of these three soil samples.

The water samples collected from MW21 and MW23 also were analyzed for TPHCs and PP+30. The water sample collected from MW22 was analyzed for volatile organics only. The only contamination detected in any of these three deep wells was for volatile organics at MW22.

2. Volatile Organics at Monitoring Well 22

The volatile organic contamination detected in the water samples from MW22 may be due to an imperfect seal around this deep well. The grout at the top of the seal has been observed to be soft and moist. The underground flume, which from the piezometric data appears to be in contact with the ground water of the shallow aquifer, is believed to be located approximately 2 feet from MW22. Contaminated water from the underground flume may be migrating into the deep well during pumping.

The volatile organics detected in MW22 are ethylbenzene (from 140 to 210 ppb) and toluene (6 ppb). These two compounds are the major contaminants detected in the water sample collected from the outfall of the flume. The concentrations of these two compounds detected in the flume are almost identical to the concentrations detected in MW22. In the underground flume, ethylbenzene was present at 220 ppb and toluene at 22 ppb.

In addition, no volatile organics were detected in the soil sample collected immediately above the deep aquifer in this location. If volatile organic contamination were present throughout the vertical extent of the aquifer at this location, the presence of at least detectable levels of the volatile organics would be expected in the soil immediately above the aquifer.

The elevation of the piezometric surface for MW22 is very close to the elevation of the water table at the adjacent shallow well, MW8, indicating that there may be communication between the two aquifers at this location. However, because there does not appear to be a gradient between these two wells, downward migration of contaminants from the shallow aquifer to the deep aquifer would not be expected. This is particularly true for compounds such as those detected in MW22 which are less dense than water. If MW22 is defective, it is likely that the ethylbenzene and toluene were drawn down into the deep well by the temporary gradient created when the well was purged prior to sampling.

An additional investigation will be necessary to determine if the well is defective or if the two aquifers are in communication with each other in this area. If the well is found to be defective, it will be removed and the borehole sealed.

C. Underground Flume

It appears that volatile organics as well as cadmium and lead are being introduced into the water which travels through the underground flume from off-site sources. The sediment sample collected at the inflow at the point where Plum's Creek goes underground also indicates that petroleum hydrocarbons, base neutrals and four other metals (chromium, mercury, silver, and zinc) may be introduced into the flume from off-site sources as well.

It appears that ethylbenzene is introduced into the underground flume at some point as it flows beneath the site. The sample collected at the inflow showed no ethylbenzene to be present; however, at the outfall, 220 ppb were reported present. The concentrations of the six other volatile organics detected as they flowed into the underground flume (chlorobenzene, 1,1-dichloroethane, trans-1,2-dichloroethane, methylene chloride, toluene, and 1,1,1-trichloroethane) remained constant as the water traveled beneath the site.

AKH000438

945990242

Toluene was the primary target compound detected in the shallow ground water, yet no increase in the concentration of toluene was noted in the underground flume. Relatively low concentrations of toluene were detected in some of the shallow wells located near the flume. Because the concentration of toluene in these wells is so low, toluene may be entering the flume at a sufficiently slow rate that it is diluted to the point that no observable difference in its concentration in the flume can be seen. The concentration of toluene at MW10, however, is high enough that it is likely that a detectable level would be seen within the flume. Because no toluene was detected in MW5 either, which appears to be downgradient of MW10, it is likely that the ground water flow in this portion of the site follows a yet unidentified path. The foundations of Building 26 and 15 may be affecting the ground water flow in this area. Further analysis will be necessary to define the direction of ground water flow in this area of the site.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. General

A number of conclusions concerning the quality of the soil and ground water at the former Textron facility may be reached based on the data collected to date. To design an appropriate cleanup program, however, additional characterization of the site through further data collection and analysis will be necessary. The conclusions that can be reached based on the data presented in this report are summarized below. A Phase Two Sampling Plan to address additional sampling needs is being prepared for submission to NJDEP. The issues which will be investigated further in the second phase of sampling are described below.

B. Conclusions

1. Contamination Related to On-site Activities

Two volatile organics, ethylbenzene and toluene, as well as petroleum hydrocarbons, appear to have been introduced into the soil of the fill unit in certain areas of the site by operations and activities which took place at the facility. The presence and relative concentrations of these compounds are consistent with known and believed uses in certain AECs.

Significant quantities of ethylbenzene and toluene are known to have been used at this facility. The only areas in which these two compounds were detected are areas in which it was suspected they might be found because of past practices at the site.

Significant concentrations of TPHCs were also reported in areas in which materials used by the plant may have come into contact with the soil. However, the plant used large quantities of non-hazardous fish and vegetable oils. Because the TPHC analysis does not differentiate between the non-hazardous fish and vegetable oils and petroleum hydrocarbons it is impossible at the current time to identify the source of the TPHC contamination seen. However, ENVIRON believes that much of the TPHCs reported may be non-hazardous fish and vegetable oils based on the heavy use of these materials. The results of the GC "fingerprint," which may differentiate between the fish and vegetable oils and the petroleum hydrocarbons, were just received and have not yet been reviewed.

2. Contamination Related to the Fill Materials

As described below, some of the total petroleum hydrocarbon contamination as well as some base neutral and metal contamination were found in unexpected locations. The presence of these compounds at such unexpected locations may be related to normal background levels of these constituents in the fill material, rather than to operations at this facility.

Significant concentrations of TPHCs were detected in unexpected areas (i.e., from soil samples collected from background monitoring wells). The range of the apparent background petroleum hydrocarbon contamination varies considerably. Even within a short distance, significant variations in the TPHC concentrations were observed.

Base neutrals also were detected in a few areas in which they were not expected. It is possible that their presence may be related to the background petroleum hydrocarbons.

Some metals were detected in a few of the soil samples; however, the concentrations of these metals varied considerably, suggesting that they maybe due to the fill material. In only a limited number of cases do the concentrations exceed the BISE guidelines. In general, the values reported for metals were only marginally above the BISE cleanup guidelines. Further, the soil samples in which the highest concentrations of the metals were found were those collected from the lower depth. If the metals had been introduced into the soil by practices at the site, the higher concentrations would be expected near the surface. In addition, none of these metals is known to have been used at the facility.

3. Interaction Between Fill Unit and Shallow Aquifer

Despite the presence of significant concentrations of ethylbenzene, toluene and TPHCs in the fill unit, very little contamination was detected in the shallow aquifer. It appears that the pavement which covers the site is preventing the infiltration of rainwater from the surface, thus inhibiting the migration of the contaminants from the soil matrix into the ground water.

The only TPHCs detected in the shallow aquifer were found in the upgradient well, MW2. This contamination apparently originated from an off-site source.

Volatile organics were detected in concentrations exceeding the the BISE guidelines in only 4 of the 11 shallow wells. The concentrations of toluene in the water are significantly greater than ethylbenzene, which is consistent with the partition coefficients for these two compounds. Except for MW10, the concentrations of total volatile organics are relatively low. Based on the results of the soil samples collected from MW10, it appears that the contamination in this monitoring well is related to localized soil contamination.

Much of the ground water of the shallow aquifer apparently flows into the underground flume, and thus the flume would be the expected discharge point for most of the contaminants which did enter the ground water. The water samples collected from the inflow and outflow of the underground flume, however, indicate that the concentrations of the contaminants which enter the flume remain constant as the flume flows beneath the site, with the exception of ethylbenzene. Ethylbenzene, which is not detected at the inflow but which is detected in a significant concentration at the outfall, appears to enter the flume at some point as it travels through the site. Ethylbenzene is not detected in significant concentrations in the ground water near the flume and may well enter the flume from the many storm drains which connect to it. Further investigations will be necessary to determine the entry point of ethylbenzene into the flume.

Toluene, which was detected in significant concentrations in four of the shallow wells, does not appear to be entering the flume at a detectable rate. This may be due to dilution of the toluene as it enters the flume, or another discharge area aside from the flume may exist at the site. An additional investigation will be necessary to further refine the current understanding of ground water flow in the shallow aquifer, in particular in the eastern portion of the site.

4. Deep Aquifer

No contamination was found to be present at either of the upgradient deep wells. Some volatile organic contamination was detected in the downgradient deep well, MW22. There is evidence to suggest that the contamination detected is due to a defect in the well rather than to actual contamination in the deep aquifer. The underground flume appears to be located within 2 feet of MW22. Because the same contaminants detected at the outfall of the flume were found in similar concentrations in the water samples collected from MW 22, it is believed that these contaminants may be introduced into the well when the well is purged prior to sampling. A further investigation will be necessary to evaluate this possibility.

C. Recommendations

Before an appropriate cleanup plan for the facility can be designed, additional sampling will be necessary. One purpose of the sampling will be to further delineate the areal extent of the contamination within certain areas in which contamination has been identified in the soil matrix. In addition, further analyses must be performed to determine whether the TPHCs reported are due to the non-hazardous fish and vegetable oils or to petroleum hydrocarbons. Further sampling may also be necessary to determine the background levels of petroleum hydrocarbons in the fill.

To refine the current understanding of the ground water flow patterns at this site, additional measurements from existing wells and from the underground flume will need to be taken. It may also be necessary to install additional monitoring wells. The Phase Two Sampling Plan will focus on gathering further information about the underground flume as well as gaining a better understanding of ground water flow in the eastern portion of the site.

In addition, further tests must be performed on MW22 to determine if the well is defective, and whether the contamination observed reflects contaminants present in the flume rather than the deep aquifer. The floor drains in Building 26 will also be addressed in the second phase of sampling. Because the drains do not appear to discharge to the storm sewer, a further attempt will be made to determine their actual discharge point.

Finally, Textron may begin evaluating cleanup levels that might be appropriate should a cleanup program be necessary for the site. This may involve an evaluation of the health and environmental risks associated with exposure to the contaminants found to be present at this site. Should Textron determine that this approach is appropriate, the Phase Two Sampling Plan may define an approach to evaluating the risks associated with exposure to various levels of the contaminants based on available toxicity data and predicted exposure patterns.

APPENDIX A:

Boring Logs

AKH000447

Textron, Newark, New Jersey

Boring No. 101

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 0.8'	Green gravel fragments
0.8 - 2.0'	Gray, brown, and black sand and gravel fill, dry
2.0 - 4.0'	Black, oil saturated sand and gravel fill, some 1" gravel fragments, moist
4.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	87, 35, 13, 12	140/300	24"
2	2.0 - 4.0' bgs	8, 7, 6, 4	300 lbs	6"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-101-1	11/20/86	10:50	VOC+15, Maleic Anhydride, Phthalic Anhydride	0.5 - 1.5'
288E-101-2	11/20/86	10:50	VOC+15, Maleic Anhydride, Phthalic Anhydride	0.5 - 1.5'
288E-101-3	11/20/86	11:10	VOC+15, Maleic Anhydride, Phthalic Anhydride	3.5 - 4.0'

Textron, Inc., Newark, New Jersey

Boring No. 201 Located at northwest corner of dumpster pad outside Building No. 32

Geologic Log

0.0 - 0.5'	Sand and blue stone gravel up to 4 cm in diameter
0.5 - 2.0'	Sand and gravel fill, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	20, 14, 5, 4	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-201-1	11/19	12:20	VOC+15, Maleic & Phthalic Anhydride	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 301 Located along railroad tracks outside Building No. 32, level ground, railroad gravel

Geologic Log

0.0 - 0.5'	Sand and railroad gravel
0.5 - 2.0'	Sand and gravel fill, up to 2.5 cm, brown to black with fragments of anhydride

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	29, 15, 13, 10	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-301-1	11/19	11:45	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 302 Located along railroad tracks outside Building No. 31

Geologic Log

0.0 - 0.5'	Sand and railroad gravel
0.5 - 2.0'	Sand and gravel fill, discolored brown to black

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

plit Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	20, 17, 13, 12	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-302-1	11/19	11:32	VOC+15, TPHC	0.5-1.5'

AKH000451

945990255

Textron, Inc., Newark, New Jersey

Boring No. 303 Located along railroad tracks outside Building No. 31

Geologic Log

0.0 - 0.5'	Sand and railroad gravel
0.5 - 2.0'	Sand and gravel fill, oily, with wood fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	5, 6, 7, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-303-1	11/19	12:00	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 401 Located between the railroad tracks behind tank farm

Geologic Log

0.0 - 0.5'	Railroad gravel and resinous material
0.5 - 2.0'	Sand and gravel fill, discolored grey to black, oily

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	15, 14, 11, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-401-1	11/19	10:55	VOC+15, GC Fingerprint, TPHC	0.0-1.0'
288E-401-2	11/19	10:55	VOC+15	0.0-1.0'

Textron, Inc., Newark, New Jersey

Boring No. 402 Located between the railroad tracks behind tank farm

Geologic Log

0.0 - 0.5'	Railroad gravel and resin
0.5 - 4.0'	Sand and gravel fill, discolored grey to black

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.0' bgs	23, 25, 17, 23	300 lb.	24"
2	2.0 - 4.0' bgs	2, 2, 2, 2	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-402-1	11/19	10:45	VOC+15, GC Fingerprint, TPHC	0.0-0.5'
288E-402-2	11/19	10:45	GC Fingerprint, TPHC	0.0-0.5'
288E-402-3	11/19	10:45	VOC+15, GC Fingerprint, TPHC	2.0-3.0'

Textron, Inc., Newark, New Jersey

Boring No. 501 Located at the end of railroad tracks behind Tank Farm

Geologic Log

0.0 - 0.5'	Railroad gravel
0.5 - 4.0'	Sand and gravel fill, discolored grey to black, poorly sorted gravel up to 3 cm

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	__, __, __, __	300 lb.	16"
2	2.0 - 4.0' bgs	__, __, __, __	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-501-1	11/19	10:20	Phthalic Anhydride	0.0-0.5'
288E-501-2	11/19	10:30	Phthalic Anhydride	2.0-3.0'

Textron, Inc., Newark, New Jersey

Boring No. 601

Geologic Log

0.0 - 0.5'	Black sand and gravel
0.5 - 1.0'	Black cinders
1.0 - 1.5'	Sand and fill (red brick and gravel)
1.5 - 2.0'	Red silty sand, gravel and fill
2.0'	Concrete

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	17, 21, 16, 13	300 lb.	20"
2	2.0 - 2.1' bgs	100/2	300 lb.	None

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW11-1	11/18/86	10:45	TPHC, PAH	1.0-2.0'

Textron, Inc., Newark, New Jersey

Boring No. 602

Geologic Log

0.0 - 2.0'	Sand, gravel and fill
2.0 - 4.0'	Gray silt, sand and fill (much red brick fragments); wet
4.0 - 4.5'	Gray silt, sand and fill; wet; HNu readings of 1-2 ppm
4.5'- ?	Concrete, apparent former foundation

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	2.0 - 4.0' bgs	2, 6, 29, 58	300 lb.	20"
2	4.0 - 4.5' bgs	100/5	300 lb.	4"
3	5.0 - 5.1' bgs	100/5	300 lb.	None

Textron, Inc., Newark, New Jersey

Boring No. 701 Located where cement pad meets asphalt northeast of Building No. 23

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, red to brown, poorly sorted with brick fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	13, 16, 12, 12	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-701-1	11/21	10:30	VOC+15	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 801

Geologic Log

0.0 - 2.0'	Black sand
2.0 - 2.5'	Black oily sand

Drilling Specifications

Drilling Method:	Hand Auger Boring
Rig:	Hand Auger
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Grout

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-801-1	11/20	13:15	TPHC, PAH	2.0-2.5'

Textron, Newark, New Jersey

Boring No. 802

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.9'	Gray, black, poorly sorted sand and gravel fill; 1-2 cm gravel fragments, brick fragments
2.9 - 3.0'	Silty clay, some peat and grass, wet, possible oil at bottom of sample
3.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 3' bgs	22, 11, 10, 6	300 lbs	15"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-802-1	11/20/86	12:00	TPHC, PAH	2.5-3.0'

Textron, Newark, New Jersey

Boring No. 803

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 0.8'	Brown silt
0.8 - 1.0'	Black sand and gravel fill
1.0 - 1.2'	Gray crushed stone
1.2 - 2.0'	Black sand and gravel fill
2.0 - 4.0'	Brown and black oily sand and gravel
4.0'	End of boring, moist

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	21, 8, 6, 5	300 lbs	18"
2	2 - 4' bgs	4, 3, 3, 2	300 lbs	2"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-803-1	11/20/86	11:35	TPHC, PAH	2.5-3.0'

Textron, Inc., Newark, New Jersey

Boring No. 804

Geologic Log

0.0 - 0.1'	Black sand
0.1 - 0.5'	Very clayey red sand
0.5 - 2.5'	Black sand and fill (red brick)

Drilling Specifications

Drilling Method:	Hand Auger
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Grout

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-804-1	11/20	14:00	TPHC, PAH	2.0-2.5'

Textron, Inc., Newark, New Jersey

Boring No. 901 Located inside Building No. 16

Geologic Log

0.0 - 0.5'	Concrete floor
0.8 - 1.0'	Resin and gravel up to 3 cm, brown to tan

Drilling Specifications

Drilling Method:	Sledge hammer and split spoon
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Covered with locking steel plate

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 1.0' below floor surface	9, __, __, __	20 lb.	6"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-901-1	11/18	15:40	VOC+15, Maleic & Phthalic Anhydride	0.8-1.0' below floor surface

Textron, Inc., Newark, New Jersey

Boring No. 1001

Geologic Log

0.0 - 0.3'	Asphalt
0.3 - 2.1'	Brown silt and muck gravel (angular, up to 6 cm in diameter)
2.1 - 2.5'	Coarse, poorly sorted brown sand and gravel
2.5 - 3.5'	Mottled, coarse, poorly sorted sand and gravel
3.5 - 6.0'	Fill (concrete, brick and cinders) with black sand and gravel

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Grout, asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	13, 9, 13, 14	300 lb.	8"
2	2.0 - 4.0' bgs	13, 17, 14, 16	300 lb.	16"
3	4.0 - 6.0' bgs	6, 2, 3, 2	300 lb.	15"
4	6.0 - 8.0' bgs	1, 1, 1, 1	300 lb.	None

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1001-1	11/18/86	12:15	TPHC	0.0-1.0'
288E-1001-1	11/18/86	12:15	VOC+15	1.0-2.0'
288E-1001-2	11/18/86	12:35	TPHC, VOC+15	4.0-6.0'

Textron, Inc., Newark, New Jersey

Boring 1201	Hand auger boring underneath first hole in floor on southwest corner of Building 4

Geologic Log

0.0 - 0.5'	Grey and beige-colored sand and gravel mixed with very sticky black resin; black sections are oily and appear to be high in TPHC; HNu reads up to 500 ppm from the sample; 2 to 400 ppm at mouth of hole, 60 to 100 ppm in breathing zone
0.5 - 1.0'	Black oily sand and gravel fill; contains some unidentifiable fibers, possibly resins; HNu readings up to 500 ppm from sample; breathing zone reads up to 60 ppm

Drilling Specifications

Drilling Method:	Hand Auger
Driller:	ENVIRON Corporation
Date Drilled:	November 12, 1986
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1201-01	11/12/86	13:30	TPHC	0.0 - 0.5'
288E-1201-02	11/12/86	13:35	VOC+15	0.5 - 1.0'

Textron, Inc., Newark, New Jersey

Boring 1202	Hole dug between the third and fourth post along the south wall of Building 4, east of the southwest corner; the sample point is located under the first hole inside the building, next to a puddle of black oily water

Geologic Log

0.0 - 0.1'	Resin layer
0.1 - 1.7'	Black sand and gravel fill with unidentifiable fibrous material; HNu reads 60 increasing to 150 ppm in the breathing zone, 100 ppm at the mouth of the hole, and 120 ppm in the sample and inside the hole

Drilling Specifications

Drilling Method:	Trowel
Driller:	ENVIRON Corporation
Date Drilled:	November 12, 1986
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1202-01	11/12/86	13:45	TPHC	0.0 - 0.4'
288E-1202-02	11/12/86	13:50	VOC+15	0.4 - 0.7'

Textron, Inc., Newark, New Jersey

Boring 1203 — This hole is located under the first hole in the floor, under the northwest corner of Building 4, at the edge of a puddle

Geologic Log

0.0 - 0.5' — Dark grey to black sand and gravel fill, mixed with fibrous resin; it contains white particles approximately 1 mm in diameter, possibly resin; HNu reads 2 to 3 ppm background before digging and remains below 10 ppm in the hole while digging

Drilling Specifications

Drilling Method:	Trowel
Driller:	ENVIRON Corporation
Date Drilled:	November 12, 1986
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1203-01	11/12/86	14:00	TPHC, VOC+15	0.0 - 0.5'

Textron, Inc., Newark, New Jersey

Boring No. 1301 Located east of Building No. 13 near nitrogen tank

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, brown to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	27, 21, 20, 25/3"	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1301-1	11/19	14:40	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1302 Located east of Building No. 13 near nitrogen tank

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	4, 4, 4, 6	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1302-1	11/19	14:10	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1303 Located east of Building No. 13 near nitrogen tank

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, with wood fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	15, 7, 9, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1303-1	11/19	15:00	VOC+15, TPHC	0.5-1.0'

AKH000470

945990274

Textron, Inc., Newark, New Jersey

Boring No. 1401 Located south of tanks 309-311

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	27, 12, 8, 9	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1401-1	11/19	16:15	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1402 Located south of tanks 309-311

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, wood fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	__, __, __, __	300 lb.	12"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1402-1	11/19	16:25	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1403 Located south of tanks 309-311

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	42, 18, 12, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1403-1	11/19	15:45	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1501 Located on the south side of site between Buildings No. 12 and 13

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, brown to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	25, 18, 16, 12	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1501-1	11/19	15:25	VOC+15, TPHC	0.5-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1503 Located on the south side of site between Buildings No. 12 and 13

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	31, 15, 15, 11	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1503-1	11/19	15:10	VOC+15, TPHC	0.5-1.5'

Textron, Newark, New Jersey

Boring No. 1504

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, brick and coal fragments, wet
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	21, 14, 6, 5	300 lbs	16"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1504-1	11/21/86	09:05	VOC+15, TPHC	1.0-1.5'

Textron, Newark, New Jersey

Boring No. 1601

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, ½" gravel fragments, oily appearance and odor, wet
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	8, 7, 5, 4	140 lbs	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1601-1	11/20/86	13:54	VOC+15, TPHC	0.1-1.5'

Textron, Newark, New Jersey

Boring No. 1602

Geologic Log

0.0 - 0.5'	Asphalt pavement (HNu 1-5 ppm in breathing zone)
0.5 - 0.8'	Gravel layer
0.8 - 1.3'	Black, oily, poorly sorted sand and gravel fill, some silt, 2" gravel fragments, HNu 5-12 ppm, peak at 50 ppm
1.3 - 2.0'	Brown, oily, poorly sorted sand and gravel fill, some silt, 2" gravel fragments, HNu 5-12 ppm, peak at 50 ppm
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	28, 20, 17, 11	140 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1602-1	11/20/86	14:04	VOC+15, TPHC	1.0-1.5'

Textron, Newark, New Jersey

Boring No. 1603

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, gravel fragments up to 1", bottom 6" oily, oily odor
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	18, 11, 7, 5	140 lbs	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1603-1	11/20/86	13:45	VOC+15, TPHC	1.0-1.5'

Textron, Newark, New Jersey

Boring No. 1701

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, miscellaneous glass, wood, and coal fragments, bottom 6" oily appearance and odor, wet at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	12, 10, 7, 6	300 lbs	22"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1701-1	11/21/86	09:15	VOC+15, TPHC	1.0-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1702 a.k.a. 1502

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, brown to black, poorly sorted up to 2.0 cm in diameter

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	15, 11, 9, 8	300 lb.	12"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1502-1	11/19	15:35	VOC+15, TPHC	0.5-1.5'

Textron, Newark, New Jersey

Boring No. 1703

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, brick and wood fragments, 1" gravel fragments, wet at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	37, 29, 23, 19	140 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1703-1	11/20/86	16:00	VOC+15, TPHC	1.0-1.5'

Textron, Newark, New Jersey

Boring No. 1801

Geologic Log

0.0 - 0.2'	Large (2") gravel fragments and asphalt
0.2 - 2.0'	Black, poorly sorted sand and gravel fill with brick, glass, and coal fragments, wet at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	15, 9, 8, 11	300 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1801-1	11/21/86	08:50	TPHC	1.0-1.5'

Textron, Inc., Newark, New Jersey

Boring No. 1901

Geologic Log

0.0 - 2.0'	Black, sandy, oily, resinous soil, HNu: 120 ppm at 1.0'; HNu: 19 ppm at 2.0'
2.0 - 2.5'	Black, sandy, very oily soil, HNu: 20 ppm at 2.5'

Drilling Specifications

- Drilling Method: Hand Auger
- Driller: Empire Soils Investigations, Inc.
- Date Drilled: 11/20/86
- Plugging Material: Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1901-1	11/20	14:00	TPHC	0.5-1.0'
288E-1901-1	11/20	14:10	VOC+15	1.0-1.5'
288E-1901-2	11/20	14:30	TPHC, VOC+15	2.0-2.5'

Textron, Inc., Newark, New Jersey

Boring No. 2101 Located on asphalt on east side of site north of Building No. 14

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to dark grey, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	20, 14, 5, 4	300 lb.	8"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2101-1	11/21	9:50	VOC+15, TPHC	0.5-1.0'

Textron, Inc., Newark, New Jersey

Boring No. 2102 Located on asphalt on east side of site north of Building No. 14

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to dark grey, poorly sorted with brick fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	46, 35, 7, 9	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2102-1	11/21	10:15	VOC+15, TPHC	0.5-1.5'

Textron, Newark, New Jersey

Boring No. 2103

Geologic Log

0.0 - 0.5'	Asphalt pavement and concrete
0.5 - 2.0'	Black and brown, poorly sorted sand and gravel fill with brick and glass fragments, wet
2.0'	Water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	9, 8, 6, 5	300 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2103-1	11/21/86	10:10	VOC+15, TPHC	1.0-1.5'

TTextron, Newark, New Jersey

Boring No. 2201

Geologic Log

0.0 - 1.3'	Miscellaneous coarse sand and gravel fill, black, oily appearance and strong oily odor
1.3'	End of boring
	4 ppm at 1-2" (1 ppm background)
	HNu 6 ppm at 6"
	19 ppm at 12"
	45 ppm at 15" (4-5 ppm background, and breathing zone)

Drilling Specifications

Drilling Method:	Trowel
Drilling Company:	ENVIRON Corporation
Date Drilled:	November 13, 1986

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2201-1	11/13/86	11:10	VOC+15, TPHC	0.5-1.0'

Textron, Inc., Newark, New Jersey

Boring No. 2301

Geologic Log

0.0 - 0.3'	Asphalt
0.3 - 2.5'	Black sand and gravel
2.5'	Moist black sand and gravel

Drilling Specifications

Drilling Method:	Hand Auger Boring with Jack Hammer
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Grout and asphalt

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2301-1	11/20	15:00	TPHC	0.5-1.0'
288E-2301-1	11/20	15:05	VOC+15	1.0-1.5'
288E-2301-2	11/20	15:15	TPHC, VOC+15	2.0-2.5'

Textron, Inc., Newark, New Jersey

Boring No. 2501 Located next to railroad tracks south of Building No. 26

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, discolored grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-555
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	38, 40, 45, 50	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2501-1	11/21	9:15	VOC+15, TPHC	0.5-1.5'

Textron, Newark, New Jersey

Boring No. 2701

Geologic Log

0.0 - 1.0'	Black silt, sand, and gravel, poorly sorted, 2" gravel fragments near top
1.0 - 2.0'	Brown silt, with sand and gravel mixed in. Bottom of spoon may have hit former concrete building footing, wet.
2.0'	End of boring

Drilling Specifications

Drilling Method:	Sledge hammer and spilt spoon
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	135 with 12 lb. sledge hammer	12 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2701-1	11/20/86	15:20	VOC+15, TPHC	1.0-1.5'

Textron, Newark, New Jersey

Boring No. 2801

Geologic Log

0.0 - 0.2'	Large (2") gravel fragments
0.2 - 2.0'	Brown and black sand and gravel with brick fragments, may have hit former concrete building footing, moist at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Sledge hammer and split spoon
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	90 with 12 lbs. sledge hammer	12 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2801-1	11/20/86	15:00	VOC+15, TPHC	1.0-1.5'

Textron, Inc., Newark, New Jersey

Boring No. Pilot Boring

Geologic Log

0.0 - 0.1'	Asphalt
0.1 - 5.0'	Very coarse black and brown sand and gravel fill, water somewhere between 4.0' and 6.0'
5.0 - 13.0'	Gray-black silty clay, some gravel, wet with oily black water
13.0 - 23.5'	Gray-black silty clay; dry
23.5 - 24.1'	Dark brown, black peat, very fibrous, well decomposed
24.1 - 24.2'	Fine gray clay
24.2 - 30.0'	Fine gray sand, trace clay, wet
30.0 - 32.0'	More coarse gray sand, trace clay, wet
32.0 - 34.0'	Coarse, gray sand with some red sand, moderately, poorly, sorted becoming coarser with depth, small gravel (4mm-1cm), fairly well rounded to well rounded, primarily quartz with some feldspar, basalt and red sandstone, wet.
34.0 - 40.0'	Coarse sand with much gravel (.4-2cm) of various types, well rounded to angular, wet
40.0 - 45.0'	Red-brown silty clay, trace gravel
45.0 - 52.0'	Coarse, reddish brown sand with some 2" layers of very fine-grained sand and clay

Drilling Specifications

Drilling Method:	Mud Rotary
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/10/86 and 11/11/86
Plugging Material:	Grout

Textron, Inc., Newark, New Jersey

Boring No. Pilot Boring - Cont'd.

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	3, 3, 4, 2	300 lb.	8"
2	2 - 4' bgs	3, 2, 2, 2	300 lb.	3"
3	4 - 6' bgs	2, 1, 0, 0	300 lb.	None
4	6 - 8' bgs	1, 0, 0, 0	300 lb.	None
5	8 - 10' bgs	1, 0, 0, 0	300 lb.	2"
6	10 - 12' bgs	1, 1, 1, 1	300 lb.	24"
7	12 - 14' bgs	1, 1, 1, 1	300 lb.	24"
8	14 - 16' bgs	1, 1, 1, 1	300 lb.	24"
10	22 - 24' bgs	1, 1, 1, 1	300 lb.	24"
11	24 - 26' bgs	7, 7, 7, 13	140 lb.	22"
12	26 - 28' bgs	11, 12, 13, 14	140 lb.	15"
13	28 - 30' bgs	8, 7, 10, 15	140 lb.	15"
14	30 - 32' bgs	7, 8, 7, 13	140 lb.	12"
15	32 - 34' bgs	11, 13, 17, 15	140 lb.	12"
16	34 - 36' bgs	10, 8, 12, 11	140 lb.	12"
17	40 - 42' bgs	14, 10, 9, 11	140 lb.	15"
18	45 - 47' bgs	21, 14, 17, 19	140 lb.	24"
19	50 - 52' bgs	13, 15, 17, 13	140 lb.	20"

APPENDIX B:

Well Specifications

Textron, Newark, NJ

Monitoring Well No. 1

Permit No. 2609839

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 4.5'	Sand and gravel fill, poorly sorted discolored grey to black, angular, with cinders
4.5 - 6.5'	Clay, light grey to grey, well sorted, dry

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Ken Bacorn
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	4.5' bgs - 1.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	1.0' bgs - 2.32' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	0.80'bgs - 2.80' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	4.5' bgs - 0.75' bgs	No. 1 Well sand	---	---
Bentonite seal	0.75'bgs - 0.5' bgs	Pellets	---	---
Grout	0.5' bgs - 1.2' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	5, 4, 3, 2	140 lb.	16"
2	2.5 - 4.5' bgs	2, 1, 2, 2	140 lb.	8"
3	4.5 - 6.5' bgs	2, 2, 1, 1	140 lb.	10"

Textron, Newark, NJ

Monitoring Well No. 1 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW1-2	11/20/86	14:20	TPHC,PP+30	1.5 - 2.5'
288E-MW1-3	11/20/86	14:20	TPHC,PP+30	1.5 - 2.5'

Observations

Development time: 1 hour
Estimated yield: 0.8 gallons per minute

Textron, Newark, NJ

Monitoring Well No. 2

Permit No. 2609839

Geologic Log

0.0 - 8.0'	Coarse, poorly sorted sediments
8.0 - 9.0'	Peat in a matrix of clay and silt

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Ken Bacorn
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	8.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 1.90' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.14'bgs - 2.14' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	8.0' bgs - 1.5 ' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5 'bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	7.0 - 9.0' bgs	__, __, __, __	300 lb.	

Observations

Development time: 7 minutes
Estimated yield: 16 gallons per minute

Textron, Newark, NJ

Monitoring Well No. 3

Permit No. 2609841

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 7.0'	Black, discolored, very poorly sorted sand and angular gravel, up to 2 cm in diameter; fill (brick fragments); water at 4.5 '
7.0 - 7.5'	Peat; grey to black, poorly decomposed with grass stems and roots
7.5 - 8.5'	Clay; light to dark grey, well sorted, dry

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Jerry Malack (1167), Chris O'Shaughnessy, and Doug Connery
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/17/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	7.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 0.44'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3 ' bgs - 0.00'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	7.0' bgs - 2.0' bgs	No. 1 Well sand	---	---
Bentonite seal	2.0' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	17, 11, 16, 13	300 lb.	6"
2	2.5 - 4.5' bgs	3, 4, 4, 3	300 lb.	2"
3	4.5 - 6.5' bgs	1, 2, 1, 1	300 lb.	8"
4	6.5 - 8.5' bgs	1, 1, 1, 1	300 lb.	18"

AKH000499

945990303

Supplementary Sampling Data From Monitoring Well 22

Date: December 18, 1986 and December 31, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: American Standard submersible pump (12/18/86) and hand bailed (12/31/86)

Number of Column Volumes Purged: 12/18/86 – approximately 0.5 volumes (pumping equipment problems)
12/31/86 – bailed dry

Time Elapsed Between Purge Completion and Sample Collection: 12/18/86 –
12/31/86 – 1 hour, 30 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	13:56	13.5	11.72	11400
12/18/86	14:26	13.0	11.19	11600
12/18/86	15:18	13.0	11.34	11700
12/18/86	16:06	11.5	7.64	16250
12/31/86	13:27	12.0	N/A	17250
12/31/86	14:02	13.0	N/A	16500
12/31/86	15:30*	13.5*	N/A	13600*

* These data are for the portion of water from which the samples 288E-MW22 (12/18/86) and 288E-MW22 (12/31/86) were collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW22	12/18/86		VOC+15, Cl
2883-MW22	12/31/86	15:30	VOC+15, Cl

0154b/032687

AKH000500

Supplementary Sampling Data From Monitoring Well 23

Date: December 18, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: Lancaster submersible pump

Number of Column Volumes Purged: Approximately 3 volumes

Time Elapsed Between Purge Completion and Sample Collection: 28 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	10:10	10.5	7.19	14000
12/18/86	10:19	11.5	7.04	14500
12/18/86	10:24	11.5	6.96	15000
12/18/86	10:30	11.5	6.92	15500
12/18/86	10:43	11.5	6.90	15600

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW23	12/18/86	11:11	PP+30, TPHC, Cl

APPENDIX F:

Sampling Location Elevations and Coordinates

Appendix F

SAMPLING LOCATION ELEVATIONS AND COORDINATES

Sampling Location		Ground Surface Elevation (MSL)	Coordinates North	Coordinates East
Boring	101	6.93	10,235.83	10,229.86
	201	6.15	10,272.92	10,493.96
	301	6.02	10,249.80	10,556.47
	302	6.08	10,214,96	10,628.52
	303	5.90	10,176.16	10,707.92
	401	6.11	10,136.33	10,791,96
	402	6.01	10,122.01	10,825.50
	501	6.07	10,085.44	10,915.42
	701	6.23	9,971.20	10,827.43
	802	6.97	10,212.35	10,211.26
	803	6.89	10,199.43	10,206.84
	1001	7.06	10,122.28	10,365.86
	1301	5.85	9,981.16	10,214.24
	1302	5.68	10,013.35	10,204.12
	1303	5.90	9,972.42	10,182.76
	1401	5.51	9,954.40	10,333.64
	1402	5.24	9,956.97	10,305.71
	1403	5.97	9,931.78	10,351.43
	1501	6.10	9,909.64	10,310.41
	1503	5.48	9,940.31	10,269.95
	1504	6.10	9,893.00	10,266.06
	1601	5.94	9,958.26	10,394.15
	1602	6.08	9,939.19	10,388.73
	1701	6.71	9,907.50	10,396.45
	1702	6.10	9,891.84	10,348.60
	1703	6.35	9,843.37	10,355.78
	1801	6.54	9,775.62	10,504.51
	2101	5.87	9,766.83	10,763.19
	2102	5.74	9,739.56	10,792.09
	2103	5.90	9,747.94	10,764.09
	2201	Non-applicable	9,759.32	10,600.92
	2301	6.18	10,004.11	10,422.97
	2501	6.74	9,918.61	10,526.55
	2801	6.18	10,082.08	10,726.41

SAMPLING LOCATION ELEVATIONS AND COORDINATES (continued)

Sampling Location	Ground Surface Elevation (MSL)	Coordinates North	Coordinates East
Well 1	5.40	10,405.54	10,261.47
2	6.01	9,989.70	10,072.27
3	6.62	10,086.47	10,393.97
4	6.56	10,060.40	10,606.55
5	6.33	9,988.75	10,657.18
6	6.48	9,789.44	10,467.75
7	5.28	10,060.44	10,948.85
8	5.89	9,963.56	10,891.26
9	6.46	9,644.57	10,743.68
10	6.94	9,875.28	10,505.48
11	6.35	10,092.74	10,713.76
21	5.94	9,993.49	10,075.52
22	5.88	9,966.79	10,893.10
23	5.48	10,401.90	10,258.58

Textron, Inc., Newark, New Jersey

Monitoring Well No. MW22

Permit No.2609852

Geologic Log

0.0 - 0.4'	Asphalt and gravel
0.4 - 4.0'	Poorly sorted black sand; gravel, up to 3cm; fill (wood chips, red brick, gravel); H-Nu: .5ppm at 4'; water at 4'
4.0 - 7.0'	Black, very discolored fine gravel, sand and silt; very poorly sorted; gravel is 1 to 2 cm in diameter and angular; sediment is wet and oily; H-Nu: 110 ppm at 6'
7.0 - 8.5'	Brown and black, very poorly sorted fine gravel, sand silt and clay; moist; H-Nu: 5 ppm at 8'
8.5 - 11.5'	Poorly sorted silty reddish-brown sand with trace rounded gravel 1 cm in diameter; becomes clay with depth; wet; H-Nu: background at 10'
11.5 - 15.0'	Black peaty clay (poorly decomposed peat); trace silt; trace gravel, angular; moist; H-Nu: background at 12 '; H-Nu = 12 ppm at 14'
15.0 - 26.0'	Black silty clay becoming grey clayey silt at depth with varying amounts of peat
26.0 - 27.5'	gray silt with fine grained sand stringers (2")
27.5 - 28.0'	Moderately coarse sand with shell fossils
28.0 - 29,0'	wet gray silt with gravel (up to 4 mm)
29.0 - 43.5'	Moderately well sorted, medium grain, reddish-grey sand; increasing in coarseness with depth; some gravel; wet
43.5 - 47.0'	Red brown clayey silt

Drilling Specifications

Drilling Method:	Hollow Stem Auger-6¾ inch ID (outer casing) and Mud Rotary (inner casing)
Rig:	CME-55
Well Driller Licence Number:	Jeff Jaworsky (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12 and 14, 1986

Monitoring Well No. 22 (continued)

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	43.5' bgs -28.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	28.5' bgs - 0.5' bgs	PVC Schedule 40	4 in.	PVC vent cap
Outer casing	16.0' bgs - 0.00'ags	Steel Schedule 40	8 in.	---
Outer casing seal	16.0' bgs - 0.5' bgs	Cement	---	---
Sand pack	43.5' bgs -27.5' bgs	No. 1 Well sand	---	---
Bentonite seal	27.5' bgs -24.5' bgs	Pellets	---	---
Grout	24.5' bgs - 0.5' bgs	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	21, 10, 7, 21	140 lb	4"
2	2.0 - 4.0' bgs	9, 8, 4, 4,	140 lb	4"
3	4.0 - 6.0' bgs	1/12, 1/12	140 lb	3"
4	6.0 - 8.0' bgs	1,1,1,1	140 lb	15"
5	8.0 -10.0' bgs	4, 3, 4, 5	140 lb	18"
6	10.0 -12.0' bgs	1, 1, 1, 1	140 lb	24"
7	12.0 -14.0' bgs	1, 1, 1, 1	140 lb	24"
8	14.0 -16.0' bgs	1, 1, 1, 1	140 lb	18"
9	22.0 -24.0' bgs	2, 2, 2, 2	140 lb	24"
10	24.0 -26.0' bgs	1, 2, 1, 1	140 lb	24"
11	26.0 -28.0' bgs	1, 4, 5, 7	140 lb	24"
12	28.0 -30.0' bgs	6, 12, 13, 7	140 lb	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW22-1	11/12/86	15:15	VOC+15	4" interval somewhere between 2-4'
288E-MW22-3	11/14/86	15:00	VOC+15, TPHC	27 - 27.5'

Observations

Development time: 1 hour
Estimated yield: 0.33 gallons per minute
Substantial pressure build-up observed within this well. Cause unknown.

Textron, Newark, NJ

Monitoring Well No. 23

Permit No. 2609850

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 4.5'	Sand and gravel fill, discolored grey to black, poorly sorted, with cinders; water at 3 feet
4.5 - 13.0'	Silty peat, well decomposed, dark grey to black; wet
13.0 - 23.0'	Gray-black silty clay; dry
23.0 - 23.9'	Well decomposed peat, brown to dark brown; dry
23.9 - 24.0'	Fine gray clay
24.0 - 38.0'	Sand, becoming coarser with depth
38.0 - 40.0'	Red-brown silty clay

Drilling Specifications

Drilling Method:	Hollow Stem Auger-6¼ inch ID (outer casing) and Mud Rotary (inner casing)
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Ken Bacorn
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 19 and 20, 1986

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	38' bgs - 28' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	28' bgs - 2.00'ags	PVC Schedule 40	4 in.	PVC vented cap
Outer casing	9.67'bgs - 2.33'ags	Steel Schedule 40	8 in.	---
Outer casing seal	9.67'bgs - 0.25'ags	Cement	---	---
Sand pack	38' bgs - 25' bgs	No. 1 Well sand	---	---
Bentonite seal	25' bgs - 22' bgs	Pellets	---	---
Grout	22' bgs - 0.25'ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Textron, Newark, NJ

Monitoring Well No. 23 (continued)

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	-, 5, 3, 4	140 lb	12"
2	2.0 - 4.0' bgs	4, 3, 2, 2	140 lb	12"
3	4.0 - 6.0' bgs	1/24	140 lb	12"
4	6.0 - 8.0' bgs	1/24	140 lb	12"
5	22.0 - 24.0' bgs	1, 1, 1, 1	140 lb.	24"
6	38.0 - 40.0' bgs	12, 14, 17, 19	140 lb.	14"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW23-1	11/19/86	15:00	TPHC, PP+30	0.5 - 1.5'
288E-MW23-2	11/19/86	15:15	TPHC, PP+30	2.0 - 3.0'
288E-MW23-3	11/20/86	10:00	TPHC, PP+30	23.0 - 24.0'

Observations

Development time: 1 hour
Estimated yield: 0.25 gallons per minute

APPENDIX C:

Summary of Well Data

AKH000509

Appendix C

SUMMARY OF WELL DATA

Well Number	Permit Number	Ground Surface Elevation[1]	Inner Casing Elevation[1]	Outer Casing Elevation[1]	Total Depth[2]
1	2609839	5.40	7.72	8.20	6.10
2	2609840	6.01	7.92	8.15	10.51
3	2609841	6.62	6.24	6.62	6.33
4	2609842	6.56	5.83	6.56	7.48
5	2609843	6.33	7.67	8.53	8.73
6	2609844	6.48	8.80	9.25	6.75
7	2609845	5.28	7.44	7.69	12.74
8	2609846	5.89	5.62	5.89	10.64
9	2609847	6.46	8.76	8.94	12.82
10	2609848	6.94	9.08	9.40	8.10
11	2609849	6.35	8.61	9.00	10.96
21	2609851	5.94	8.32	8.48	45.83
22	2609852	5.88	5.43	5.88	41.67
23	2609850	5.48	7.53	7.81	39.92

1 All elevations are in feet and are given relative to mean sea level.
2 The total depth is given in feet and measured from the top of the inner casing.

APPENDIX D:

Well Development Data

AKH000511

Appendix D

WELL DEVELOPMENT DATA

Monitoring Well	Pump Type	Development Time	Total Yield (gals.)	Rate of Yield (gals./min.)	Description of Water
1	Centrifugal vacuum	1 hr.	50	0.8	Clear
2	Centrifugal vacuum	6.5 min.	110	16	Oily appearance, odor
3	Centrifugal vacuum	1 hr.,40 min.	165	6	Oil sheen, fairly clear, slightly bubbly
4	Centrifugal vacuum	1 hr.	~5	0.08	Cloudy
5	Centrifugal vacuum	25 min.	55	2.2	Clear
6	Centrifugal vacuum	22.5 min.	55	2	NA
7	Air surging	1 hr.	30	0.5	NA
8	Centrifugal vacuum	NA	NA	0.7	NA
9	Centrifugal vacuum	19 min.,45 sec.	55	2.7	Slight odor
10	Centrifugal vacuum	1 hr.,45 min.	35	0.3	Rust color, slight odor
11	Centrifugal	30 min.	45	1.5	Clear
21	Air surging	1 hr.	15	0.25	Clear
22	Air surging	1 hr.	20	0.33	Clear, foamy
23	Air surging	1 hr.	15	0.25	Clear

Note: NA indicates that the information is not available.

AKH000512

APPENDIX E:

Supplementary Well Sampling Data

Supplementary Sampling Data From Monitoring Well 1

Date: December 18, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: N/A

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	11:23	9.0	6.92	2500
12/18/86	11:32	9.0	6.70	2400
12/18/86	11:38	9.0	6.62	2400
12/18/86	11:44	9.0	6.58	2400

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW1	12/18/86	Sometime between 11:44 and 13:44	VOC+15, TPHC, Cl

AKH000514

0154b/032687

Supplementary Sampling Data From Monitoring Well 2

Date: December 22, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.9

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/22/86	12:23	11.5	6.87	N/A
12/22/86	12:30	11.0	6.70	N/A
12/22/86	12:36	11.0	6.62	N/A
12/22/86	12:45	11.0	6.58	N/A

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW2	12/22/86	Sometime between 12:45 and 14:45	VOC+15, TPHC, Cl

AKH000515

Supplementary Sampling Data From Monitoring Well 3

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.2

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	N/A	10.5	6.80	2200
12/12/86	N/A	11.5	6.72	1250
12/12/86	N/A	12.0	6.63	1260
12/12/86	N/A	12.0	6.65	1350
12/12/86	N/A	12.0*	6.59*	1280*

* These data are for the portion of water from which the sample 288E-MW3 was collected.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW3	12/12/86	N/A	VOC+15, TPHC, Cl

Note: N/A indicates that the information is not available.

AKH000516

0154b/032687

945990319

Textron, Newark, NJ

Monitoring Well No. 3 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW3-1	11/17/86	12:00	TPHC,	0.5 - 1.5'
288E-MW3-1	11/17/86	12:05	VOC+15	1.5 - 2.0'
288E-MW3-2	11/17/86	13:10	TPHC, VOC+15	4.0 - 4.5'

Observations

Development time: 1 hour, 40 minutes
Estimated yield: 6 gallons per minute

AKH000517

Textron, Newark, New Jersey

Monitoring Well No. 4

Permit No. 2609842

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 0.8'	Crushed stone
0.8 - 2.0'	Black sand and gravel fill, with coal traces; dry; H-Nu = 0 ppm
2.0 - 3.5'	Black and dark brown silty clay with sand and gravel fragments mixed in.; H-Nu = 1ppm
3.5 - 4.0'	White sand fill; water at 3.5 feet
4.0 - 5.0'	White and cream colored sand and gravel; fill (possibly crushed brick); wet
5.0 - 6.0'	Black sand and gravel (was white but is coated with oily water); wet; H-Nu = 0 ppm
6.0 - 8.0'	Black sand and gravel, traces of clay, traces of white/cream sand and gravel mixture; wet; H-Nu = 2 ppm
8.0 - 10.0'	Black plastic clay, traces of peat fibers

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Well Driller/ Licence Number:	Walter Ketter (1316) and Mike Dillon
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	8.0' bgs -2.0 ' bgs	PVC No. 20 slot	4 in.	PVC end cap
Inner casing	2.0' bgs -0.70' bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3 ' bgs -0.00' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	8.0' bgs -1.5 ' bgs	No.1 Well sand	---	---
Bentonite seal	1.5' bgs -1.0 ' bgs	Pellets	---	---
Grout	1.0' bgs -0.70' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

AKH000518

Monitoring Well No. 4 (continued)

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	181, 27, 17, 15	140 lbs	12"
2	2 - 4' bgs	2, 4, 6, 7	140 lbs	8"
3	4 - 6' bgs	5, 2, 1, 1	140 lbs	6"
4	6 - 8' bgs	1, 1, 1, 2	140 lbs	6"
5	8 - 10' bgs	1/24"	140 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
228E-MW4-1	11/19/86	11:30	VOC+15	0.5 - 1.0' bgs
228E-MW4-2	11/19/86	11:35	VOC+15	3.0 - 3.5' bgs

Observations

Development time: 1 hour
Estimated yield: 0.08 gallons per minute

Textron, Newark, New Jersey

Monitoring Well No. 5

Permit No. 2609843

Geologic Log

0.0 - 0.2'	Gravel (angular) clay; some sand
0.2 - 4.0'	Fill (layers of black cinders, red brick and yellow brick); water at 4.0'
4.0 - 7.5'	Black, silty, poorly sorted, coarse sand: gravel (maximum 2 cm); wet
7.5 - 8.0'	Peat and clay

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	7.5' bgs -2.5 ' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.5' bgs -1.35' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.2' bgs -2.2 ' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	7.5' bgs -1.5 ' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5' bgs -1.0 ' bgs	Pellets	---	---
Grout	1.0' bgs -0.4 ' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	13, 16, 21, 10	140 lbs	18"
2	2.0 - 4.0' bgs	21, 23, 13, 17	140 lbs	4"
3	4.0 - 6.0' bgs	10, 9, 9, 6	140 lbs	6"
4	6.0 - 8.0' bgs	2, 2, 2, 1	140 lbs	6"

AKH000520

Monitoring Well No. 5 (continued)

Samples Gollected

Sample ID No.	Date	Time	Analyses	Depth
228E-MW5-1	11/18/86	11:30	TPHC	0.5 - 1.0' bgs
228E-MW5-2	11/18/86	11:35	VOC+15	1.0 - 1.5' bgs

Observations

Development time: 25 minutes
Estimated yield: 2.2 gallons per minute

Textron, Newark, NJ

Monitoring Well No. 6

Permit No. 2609844

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 7.0'	Discolored grey to black, poorly sorted sand; gravel up to 2.5 cm in diameter, angular; fill (glass and brick fragments); strong chemical odor; water at 5'
7.0 - 9.0'	Peat, dark grey to black, poorly decomposed, with clay interbedded; moist

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Jerry Malack (1167)
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/17/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	7.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 2.33'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.77'bgs - 2.77'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	7.0' bgs - 2.0' bgs	No. 1 Well sand	---	---
Bentonite seal	2.0' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	1.0 - 3.0' bgs	25, 20, 31, 12	300 lb.	24"
2	3.0 - 5.0' bgs	4, 5, 4, 4	300 lb.	3"
3	5.0 - 7.0' bgs	2, 1, 2, 2	300 lb.	1"
4	7.0 - 9.0' bgs	1, 1, 1, 1	300 lb.	24"

AKH000522

Textron, Newark, NJ

Monitoring Well No. 6 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW6-1	11/17/86	15:55	TPHC, PP+30 (except VOC)	1.0 - 2.0'
288E-MW6-1	11/17/86	15:55	VOC+15	2.0 - 3.0'
288E-MW6-2	11/17/86	16:30	TPHC, PP+30 (except VOC)	6.0 - 7.0'
288E-MW6-3	11/17/86	16:45	TPHC, PP+30 (except VOC)	Wash blank

Observations

Development time: 22.5 minutes
Estimated yield: 2 gallons per minute

AKH000523

Textron, Newark, NJ

Monitoring Well No. 7

Permit No. 2609845

Geologic Log

0.0 - 3.5'	Coarse, poorly sorted sand (some orange); angular gravel fill, up to 2 cm; moist
3.5 - 5.0'	Silty sand and gravel; wet; very oily
5.7 - 7.0'	Large stones, possibly from break-wall; black silt; wet; oily odor
7.0 - 11.0	Sand and silt; moist
11.0 - 12.0'	Silty clay; dry

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86 and 11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	11.0'bgs - 1.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	1.5' bgs - 2.05'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.41'bgs - 2.41'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	11.0'bgs - 1.0' bgs	No. 1 Well sand	---	---
Bentonite seal	1.0' bgs - 0.75'bgs	Pellets	---	---
Grout	0.75'bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Textron, Newark, NJ

Monitoring Well No. 7 (continued)

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	4, 7, 9, 12	140 lb.	8"
2	2.0 - 4.0' bgs	9, 5, 5, 15	140 lb.	10"
3	4.0 - 6.0' bgs	7, 17, 21, 25	140 lb.	12"
4	6.0 - 8.0' bgs	1, 1, 1, 1	140 lb.	6"
5	8.0 - 10.0' bgs	2, 2, 3, 2	140 lb.	15"
6	10.0 - 12.0' bgs	7, 6, 7, 5	140 lb.	20"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW7-1	11/18/86	14:00	TPHC	0.5 - 1.0'
288E-MW7-1	11/18/86	14:05	VOC+15	1.0 - 1.5'
288E-MW7-2	11/18/86	14:30	TPHC,VOC+15	4.0 - 6.0'

Observations

Development time: 1 hour
Estimated yield: 0.5 gallons per minute

Textron, Newark, NJ

Monitoring Well No. 8

Permit No. 2609846

Geologic Log

0.0 - 0.4'	Asphalt and gravel
0.4 - 11.0'	Black silty sand; gravel fill (4" and 5" in diameter)

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Tom Brown (1311) and Dennis Bailey
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	11.0'bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 0.35'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3 ' bgs - 0.00'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	11.0 bgs - 1.5' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0 'bgs - 0.5' bgs	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	10, 15, 22, 17	300 lb.	12"

Textron, Newark, NJ

Monitoring Well No. 8 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW8-1	11/20/86	11:40	VOC+15	1.0 - 2.0'

Observations

Development time: 1 hour
Estimated yield: 0.7 gallons per minute

Textron, Inc., Newark, New Jersey

Monitoring Well No. 9

Permit No. 2609847

Geologic Log

0.0 - 6.0'	Very poorly sorted coarse textured sandy, gravelly, silty fill; gravel is angular with diameters up to 1 cm; extensive man-made fragments of crushed ceramic, bricks, coal; water at 3 feet; black and brown discolored wood fragments increase with depth
6.0 - 8.0'	Partly decomposed wood fragments mixed with angular platey gravel up to 1 cm in diameter; trace clay and sand; oily
8.0 - 11.0'	Peaty decomposed wood fragments mixed with black discolored silt and clay; also contains glass and ceramic fragments;
11.0 - 12.0'	Moist grey fine sand and clay

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13-14, 1986

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	10.0'bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 2.31'ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.48'bgs - 2.48'ags	Steel Schedule 40	8 in.	Steel with lock
Sand pack	10' bgs - 1.5' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	32, 71, 28, 21		22"
2	2 - 4' bgs	25, 17, 7, 8		1.2' 15"
3	4 - 6' bgs	2, 6, 9, 100/5		12"
4	6 - 8' bgs	1, 1, 1, 1		24"
5	8 - 10' bgs	1, 1, 1, 1		18"'
6	10 - 12' bgs	1, 1, 1, 1		24"

Monitoring Well No. MW9 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW9-01	11/13/86	4:30 p.m.	TPHC,PP+30 (except VOCs)	0 to 18"
288E-MW9-01	11/13/86	4:30 p.m.	VOC+15	18 to 24"
288E-MW9-02	11/13/86	4:45 p.m.	TPHC,PP+30 (except VOCs)	6" interval somewhere between 2.0 to 3.5'
288E-MW9-02	11/13/86	4:45 p.m.	VOC+15	6" interval somewhere between 2.5 and 4.0'

Observations

Development time: 20 minutes
Estimated yield: 2.7 gallons per minute
Bubbling observed in well, probably due to decomposition of peat.

Textron, Inc., Newark, New Jersey

Monitoring Well No. 10

Permit No. 2609848

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 4.5'	Black, brown, poorly sorted sand; coarse angular gravel, up to 2 cm; fill (glass, cinders); H-Nu: 12 ppm at 4.5'
4.5'- 8.5'	Black peat, poorly decomposed with shell fragments; grey-black clay; water at 5'; chemical odor

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acher AD II
Well Driller/ Licence Number:	Jerry Malack (1167), Tom Brown (1311) and Chris O'Shaughnessy
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	6.5' bgs - 1.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	1.5' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.46'bgs - 2.46'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	6.5' bgs - 1.0' bgs	No. 1 Well sand	---	---
Bentonite seal	1.0' bgs - 0.5' bgs	Pellets	---	---
Grout	0.5' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5 ' bgs	4, 4, 5, 4	140 lb	24"
2	2.5 - 4.5 ' bgs		140 lb	10"
3	4.5 - 6.5 ' bgs		140 lb	8"
4	6.5 - 8.5 ' bgs		140 lb	10"

AKH000530

945990333

Textron, Inc., Newark, New Jersey

Monitoring Well No. 10 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW10-1	11/18/86	11:20	TPHC, BN+10, AE+5, VOC+15	0.5 - 1.5 '
288E-MW10-2	11/18/86	11:50	TPHC, BN+10, AE+5, VOC+15	4.0 - 5.0 '

Observations

Development time: 1 hour 45 minutes
Estimated yield: 0.3 gallons per minute

Textron, Inc., Newark, New Jersey

Monitoring Well No. 11

Permit No. 2609849

Geologic Log

0.0 - 4.5'	Fill (cinders, brick); black sand; gravel; some grey silt; water at 3'
4.5 - 9.0'	Silty peat

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	9.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 2.23'ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.5' bgs - 2.65'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	9.0' bgs - 1.5' bgs	No.1 Well sand	---	---
Bentonite seal	1.5' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	5.0 - 7.0' bgs	2, 1, 2, 1	300 lb	24"
2	7.0 - 9.0' bgs	1, 1, 1, 1	300 lb	24"

Observations

Development time: 30 minutes
Estimated yield: 1.5 gallons per minute
Bubbling observed in well, probably due to decomposition of peat.

Textron, Inc., Newark, New Jersey

Monitoring Well No. 21

Permit No. 2609851

Geologic Log

0.0 - 0.5'	Very poorly sorted quartz gravel (well-rounded 1 mm to 2 cm in diameter) and coarse grey silty sand
0.5 - 1.5'	Hard, black, discolored, very poorly sorted gravel, sand and silt; oily odor
1.5 - 2.0'	Wood, possibly railroad tie; water at 2 feet
2.0 - 8.0'	Very poorly sorted black, oily discolored wet silt, sand, and fine gravel; gravel is up to 4 mm in diameter; strong chemical order, some partly decomposed organic matter, apparently a swamp deposit
8.0 - 10.0'	Partly decomposed, woody peat in a matrix of clay and silt; peat concentration decreases with depth
10.0 - 30.5'	Peat and black clayey silt; bivalve shell fossils from 13-15'; oil observed from 24 - 28'
30.5 - 37.0'	Sand and silt; water at 32.5 feet
37.0 - 43.0'	Poorly sorted sand and well rounded gravel (up to 2 cm); wet
43.0 - 44.5'	Very fine red sand and clay; moist
44.5 - 46.0'	Sandy red clay; some silt; moist

Drilling Specifications

Drilling Method:	Hollow Stem Auger-6¼ inch ID (outer casing) and Mud Rotary (inner casing)
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworsky (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13 and 17, 1986

Monitoring Well No. 21 (continued)

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	45.0'bgs -35.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	35.0'bgs -2.41' ags	PVC Schedule 40	4 in.	PVC vent cap
Outer casing	9.46'bgs -2.54' ags	Steel Schedule 40	8 in.	
Outer casing seal	9.46'bgs -0.25' ags	Cement	---	---
Sand pack	45.0'bgs -32.5' bgs	No. 1 Well sand	---	---
Bentonite seal	32.5'bgs -28.0' bgs	Pellets	---	---
Grout	28.9 bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	13, 70, 100/5	140 lb	8"
2	2.0 - 4.0' bgs	9, 11, 35, 6	140 lb	16"
3	4.0 - 6.0' bgs	6, 5, 3, 2	140 lb	2"
4	6.0 - 8.0' bgs	2, 2, 1, 1	140 lb	15"
5	8.0 -10.0' bgs	1/12, 1/12	140 lb	18"
6	10.0 -12.0' bgs	1/12, 1/12	140 lb	24"
7	13.0 -15.0' bgs	2, 3, 3, 4	140 lb	24"
8	22.0 -24.0' bgs	3, 3, 4, 3	140 lb	6"
9	24.0 -26.0' bgs	2, 2, 3, 4	140 lb	5"
10	26.0 -28.0' bgs	2, 2, 3, 4	140 lb	5"
11	28.0 -30.0' bgs	5, 4, 7, 6	140 lb	15"
12	30.0 -32.0' bgs	7, 15, 20, 26	140 lb	18"
13	32.0 -24.0' bgs	7, 5, 6, 8	140 lb	20"
14	37.0 -39.0' bgs	11, 11, 8, 10	140 lb	12"
15	42.0 -44.0' bgs	25, 21, 20, 18	140 lb	6"
16	44.0 -46.0' bgs	12, 13, 12, 10	140 lb	12"

Samples Collected

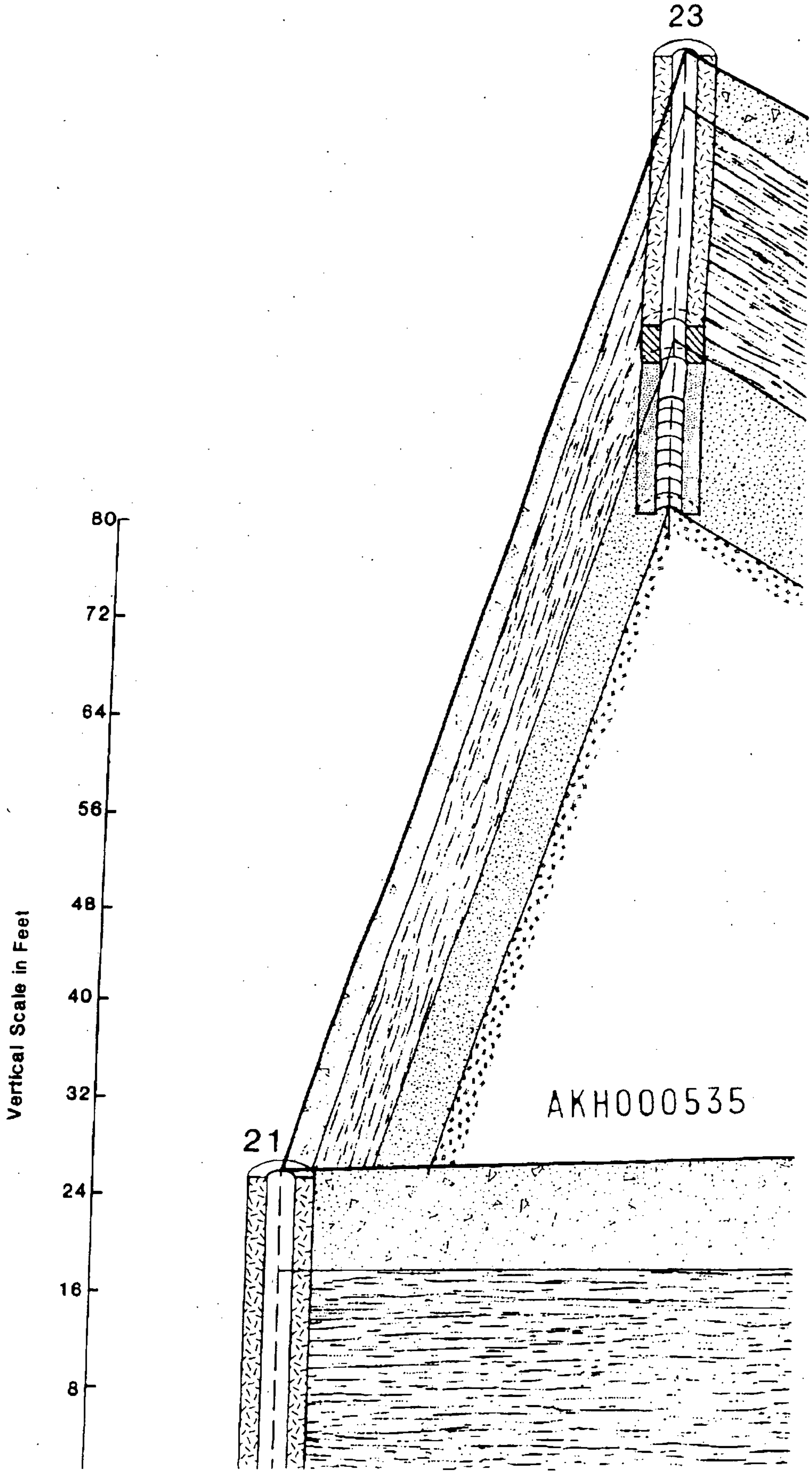
Sample ID No.	Date	Time	Analyses	Depth
288E-MW21-1	11/13/86	10:30	TPHC, PP+30 (except VOC+15)	0.5 - 1.5'
288E-MW21-1	11/13/86	10:30	VOC+15	1.0 - 1.5'
288E-MW21-2	11/17/86	14:00	TPHC, PP+30	31 - 32'

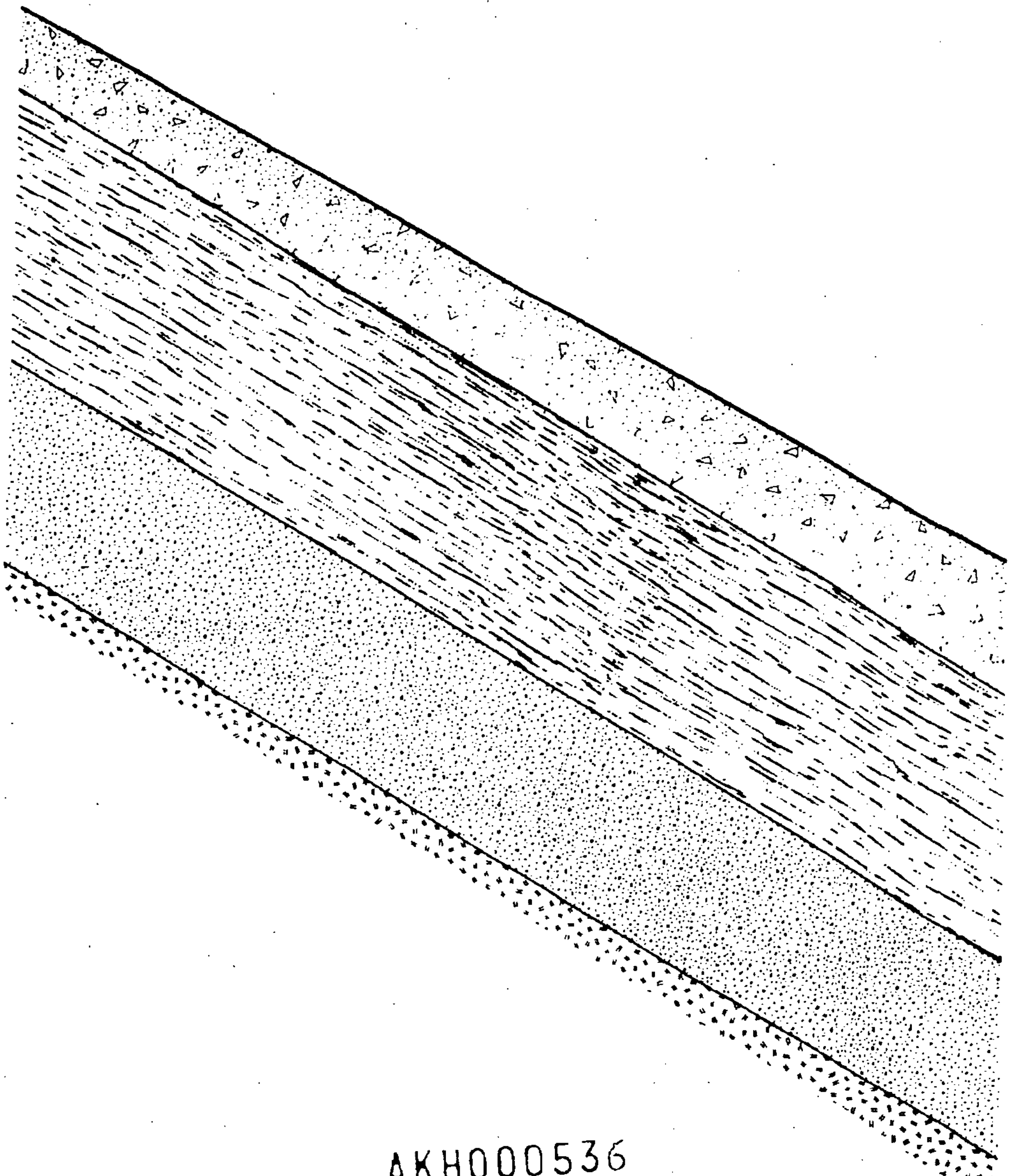
Observations

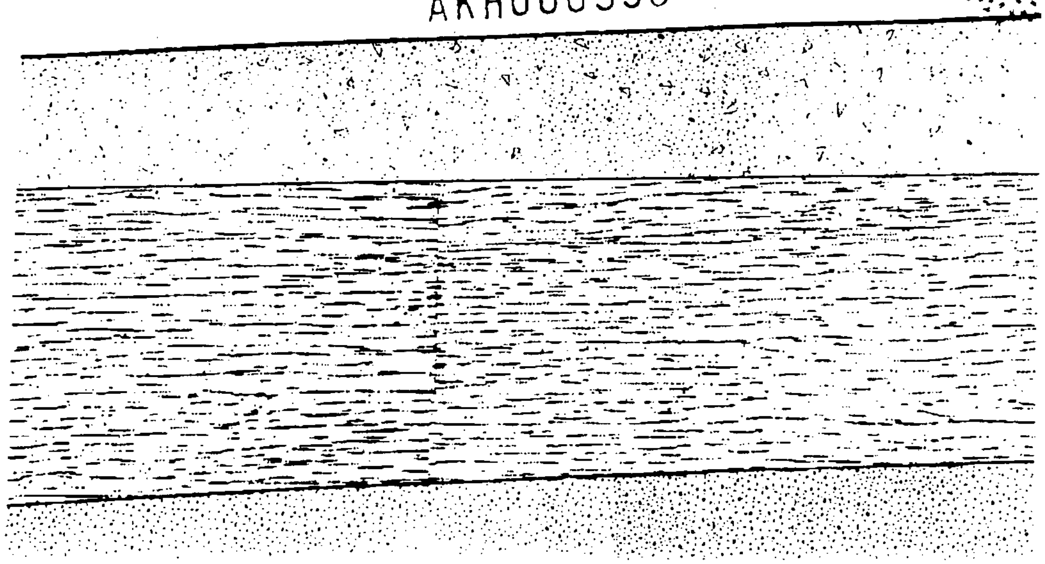
Development time: 1 hour
Estimated yield: 0.25 gallons per minute

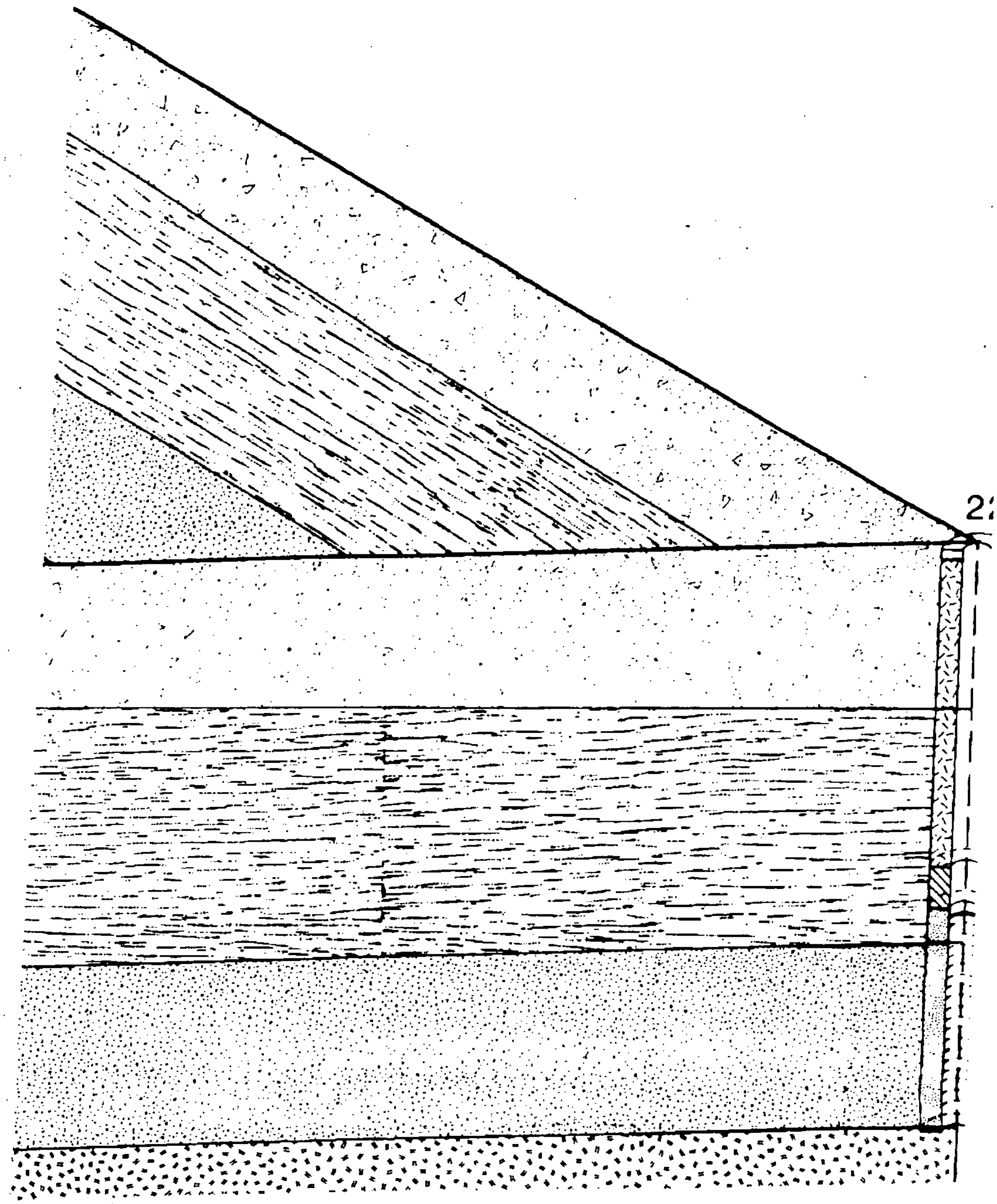
AKH000534

945990337

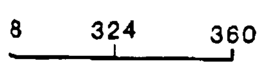

23
21
80
72
64
56
48
40
32
24
16
8
Vertical Scale in Feet
AKH000535





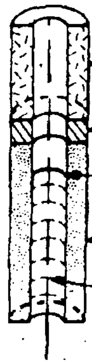


AKH000537



945990340

WELL CONSTRUCTION



GEOLOGY

Ground Surface

Fill

Clay, Silt, and Peat

Sand and Gravel

Red - Brown Clay and Silt

Wells MW 21, MW 22, and MW 23 are telescoped. This outer casing, which installed at least one foot into the clay, silt, and peat layer, is not depicted.

ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, N.J. 08540
1000 POTOMAC ST., N.W. WASHINGTON D.C. 20007

Plate: 3

DEEP WELL FENCE DIAGRAM

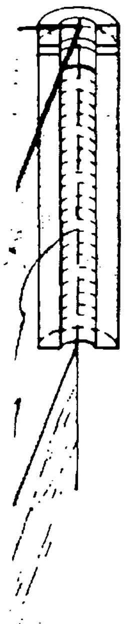
Spencer Kellogg, Formerly a Division of Textron Inc.

DATE February, 1987.	DRAFTED BY: C. GWYNN CHECKED BY L. CUTLER

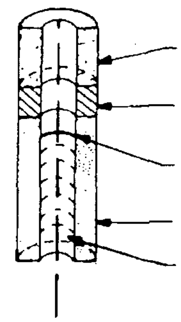
AKH000538

945990341

7



WELL CONSTRUCTION



GEOLOGY

(line)	Ground Surface
(box)	Fill
(box)	Sand and Gravel
(box)	Silt and Sand
(box)	Clay, Silt, and Peat

The clay, silt, and peat layer is depicted in this diagram with a standard thickness for clarity. The actual thickness of this layer, based on data from deep wells adjacent to shallow wells 1, 2, and 8, varies from 17.5 to 22.5 feet.

ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, N.J. 08540
1000 POTOMAC ST., N.W., WASHINGTON D.C. 20007

Plate: 2

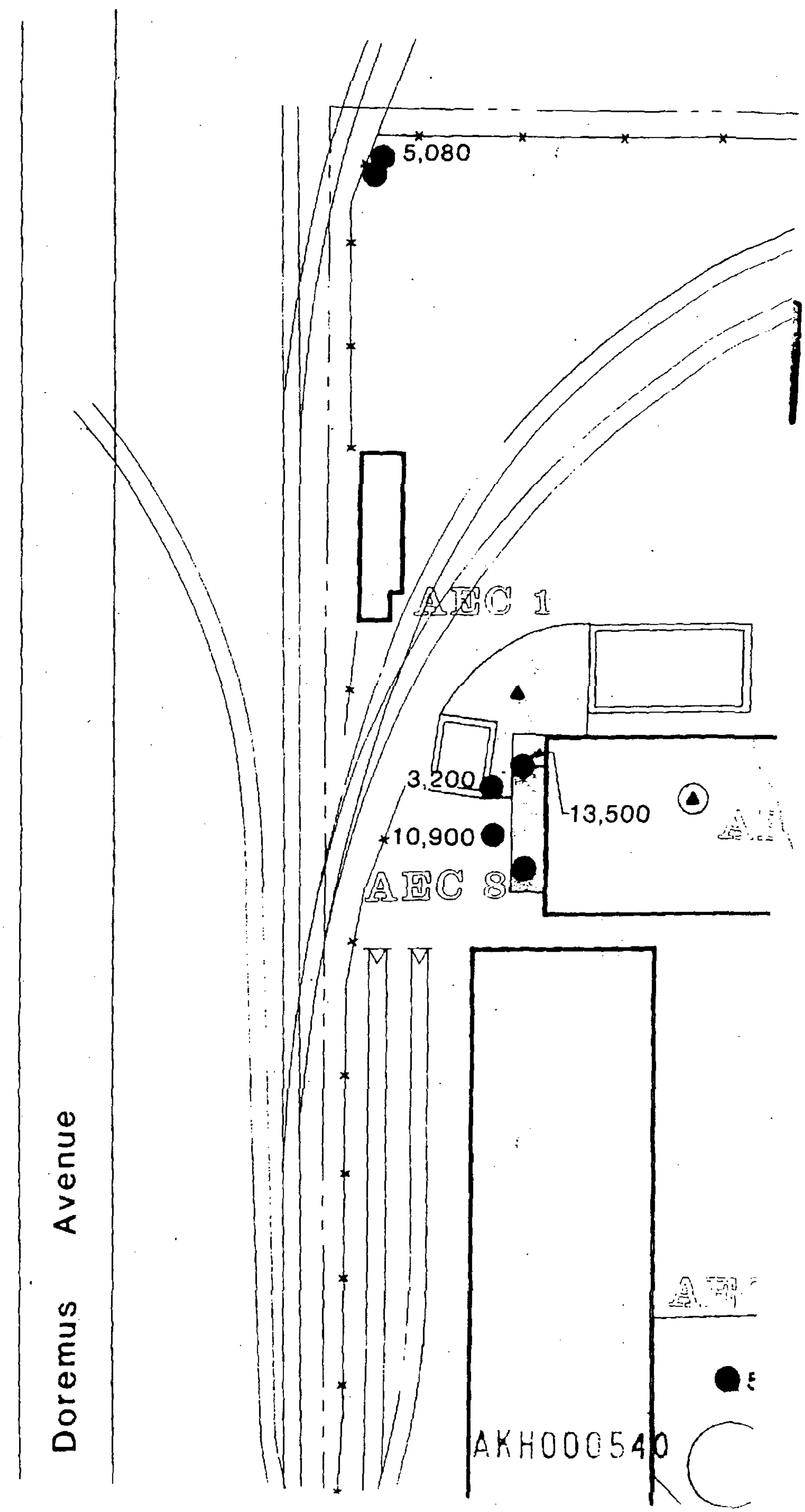
SHALLOW WELL FENCE DIAGRAM

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

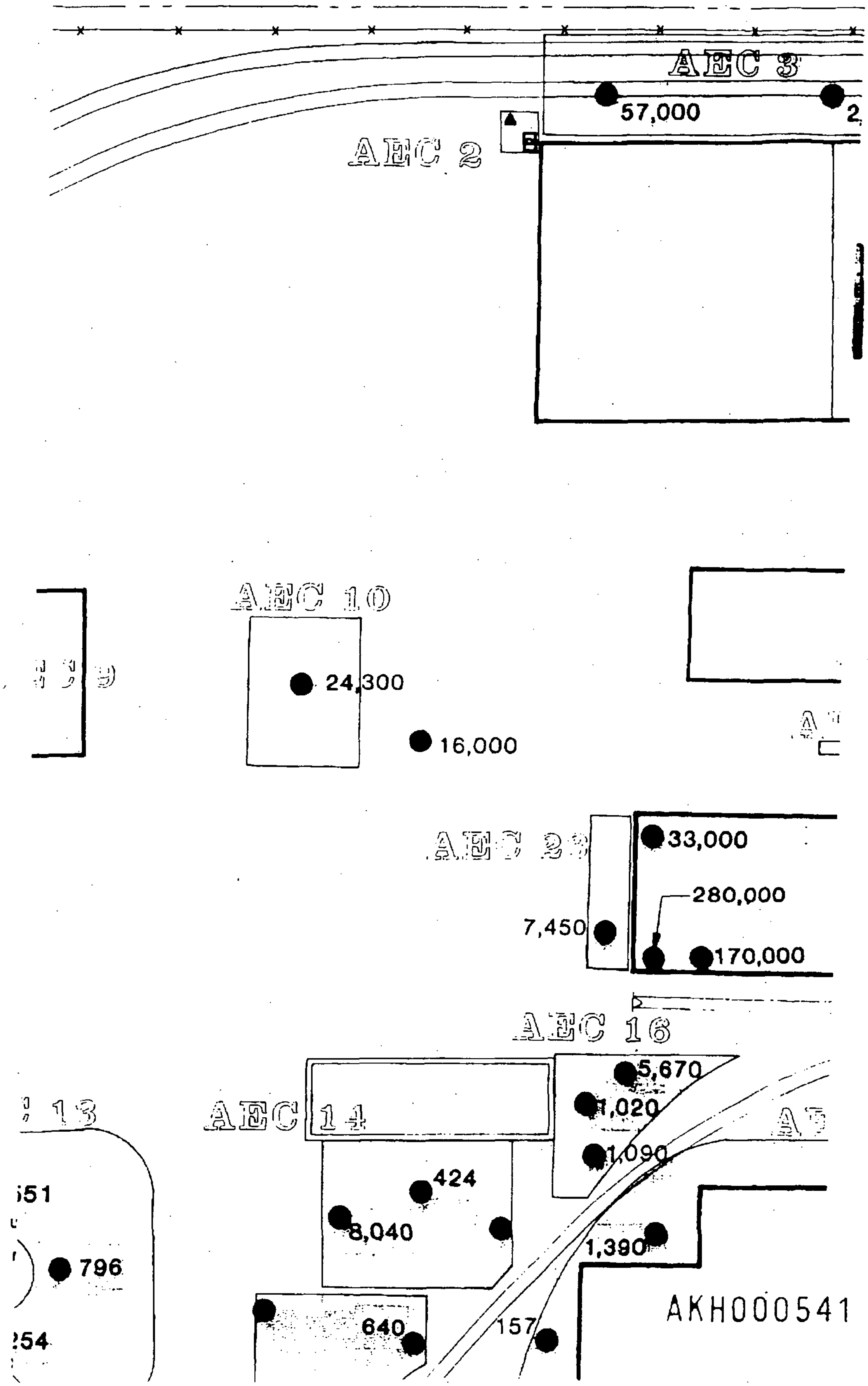
DATE	DRAFTED BY C. GWYNN
February, 1987.	CHECKED BY L. CUTLER

AKH000539

945990342

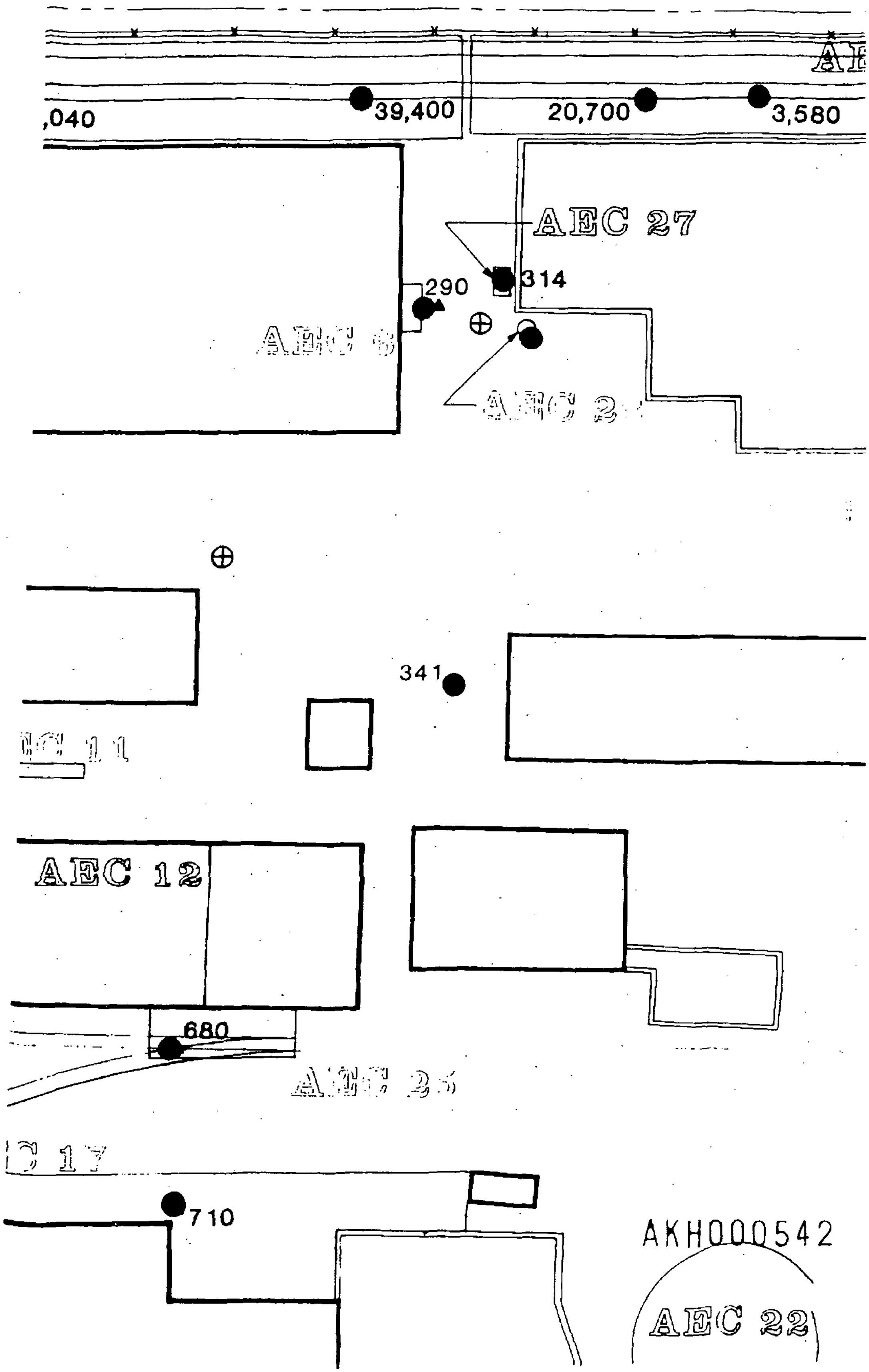


945990343

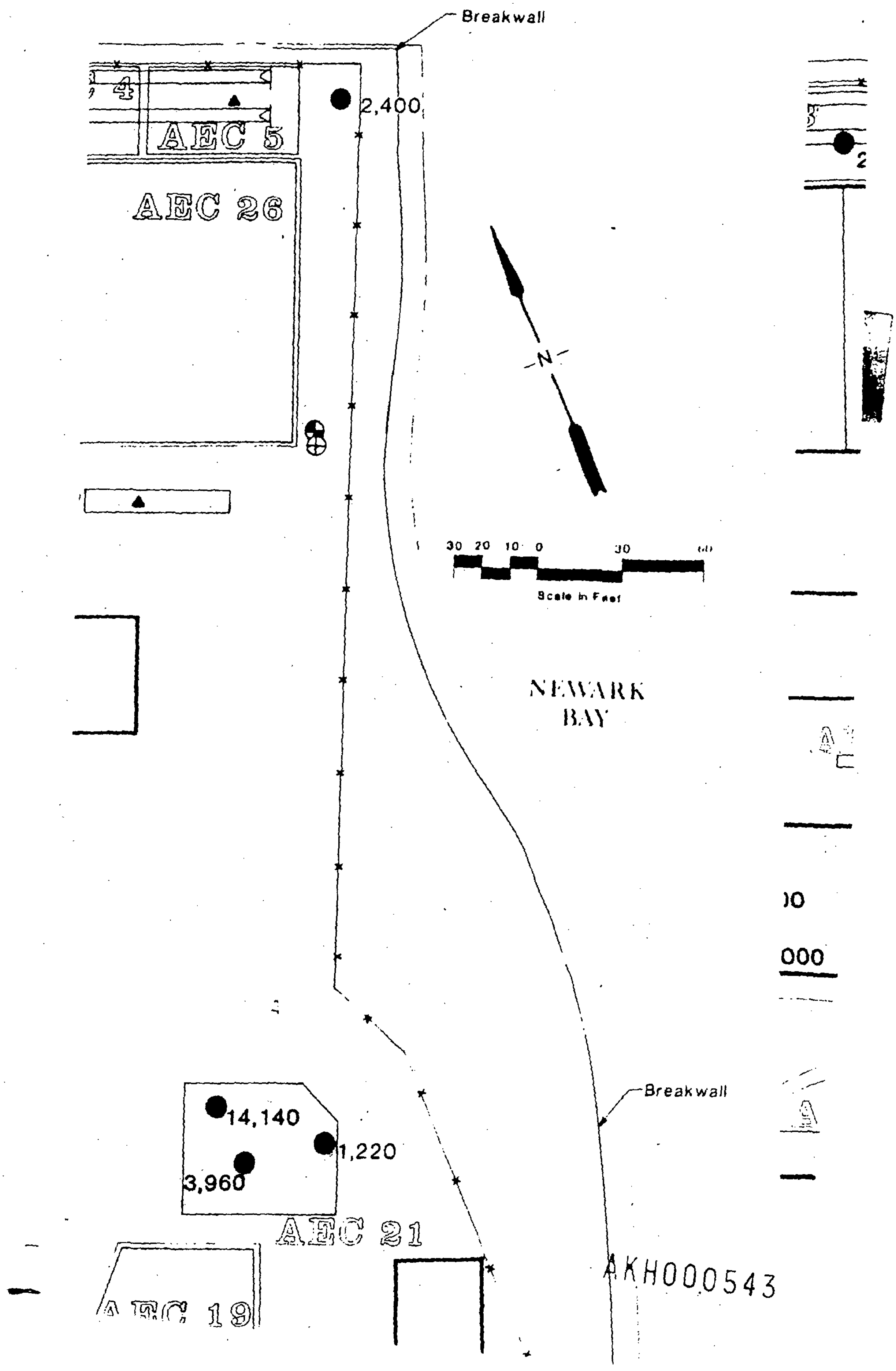


AEC 3
57,000
AEC 2
AEC 10
24,300
16,000
AEC 23
33,000
280,000
7,450
170,000
AEC 16
5,670
1,020
1,090
AEC 14
424
8,040
1,390
796
640
157

AKH000541

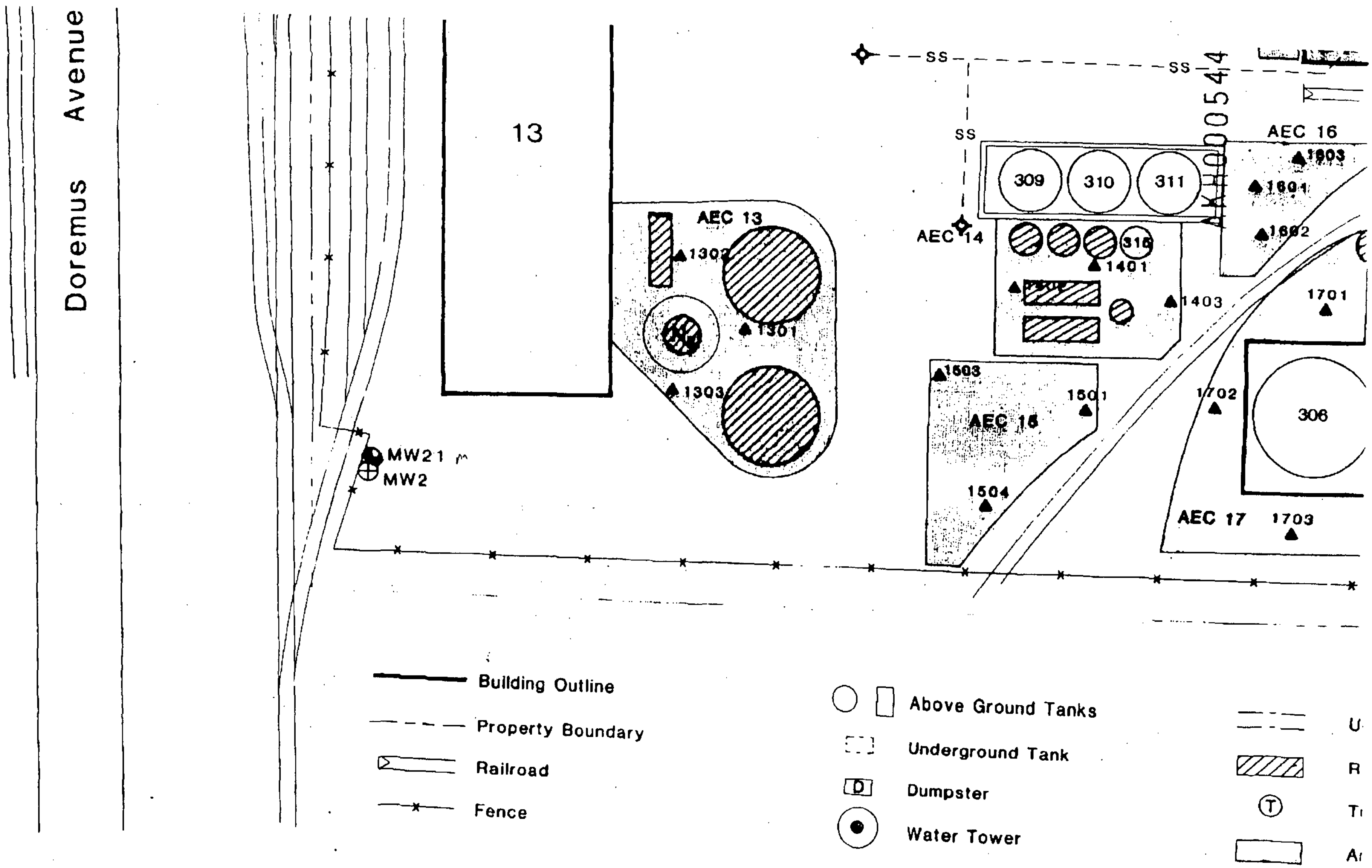


,040
39,400
20,700
3,580
AEC 27
314
290
AEC 6
341
AEC 12
680
710
AEC 22



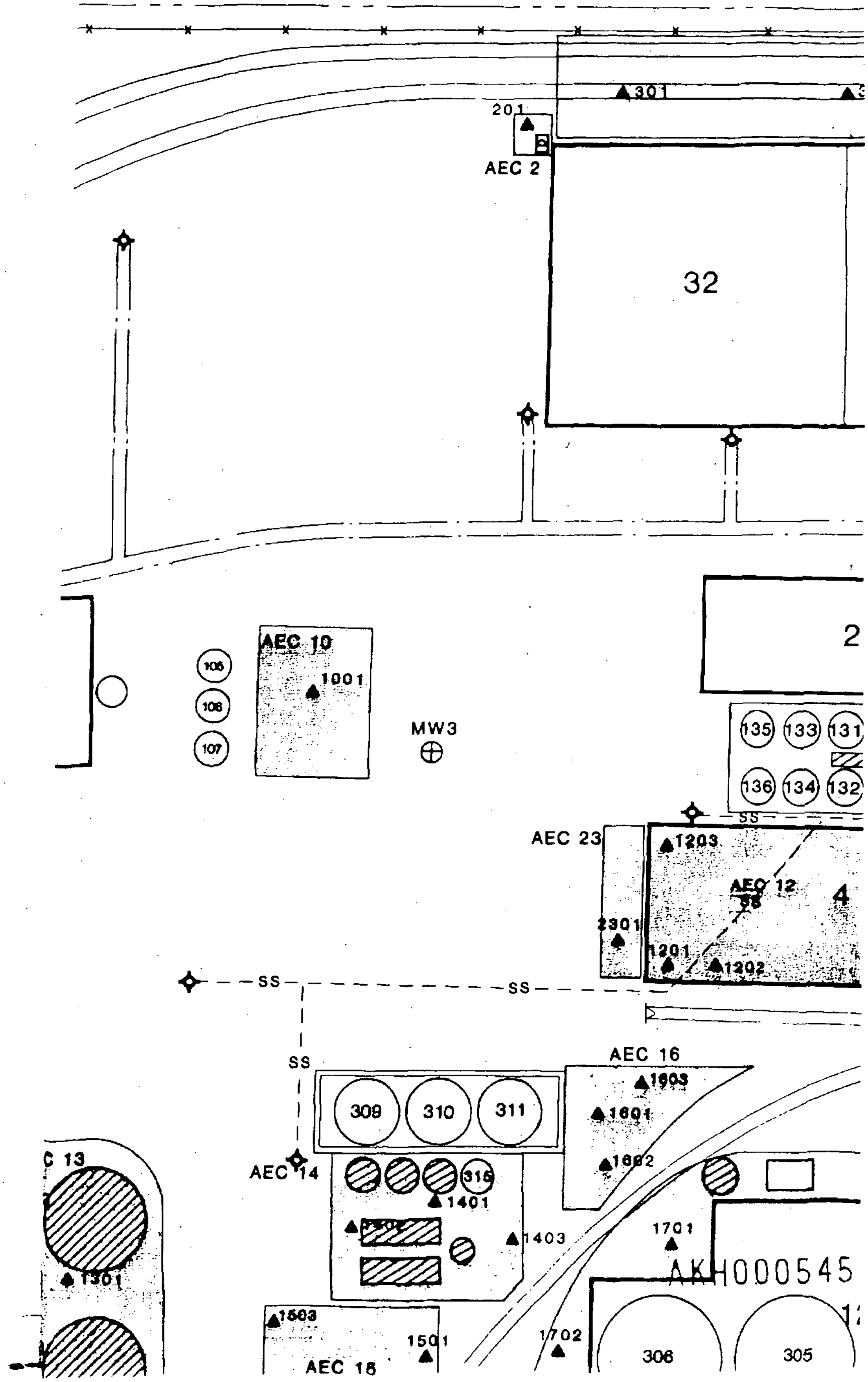
AKH000543

945990346

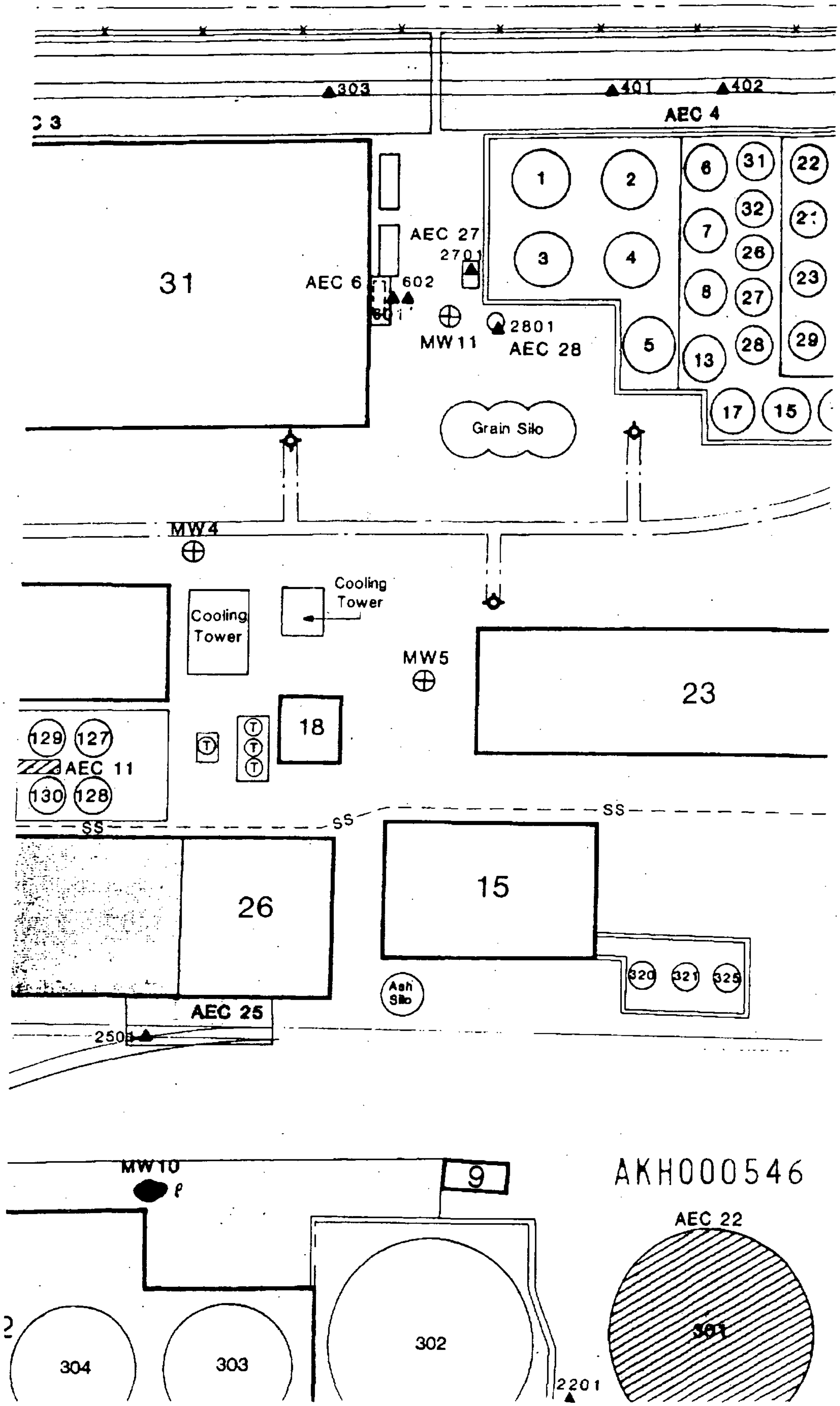


AKH000544

945990347

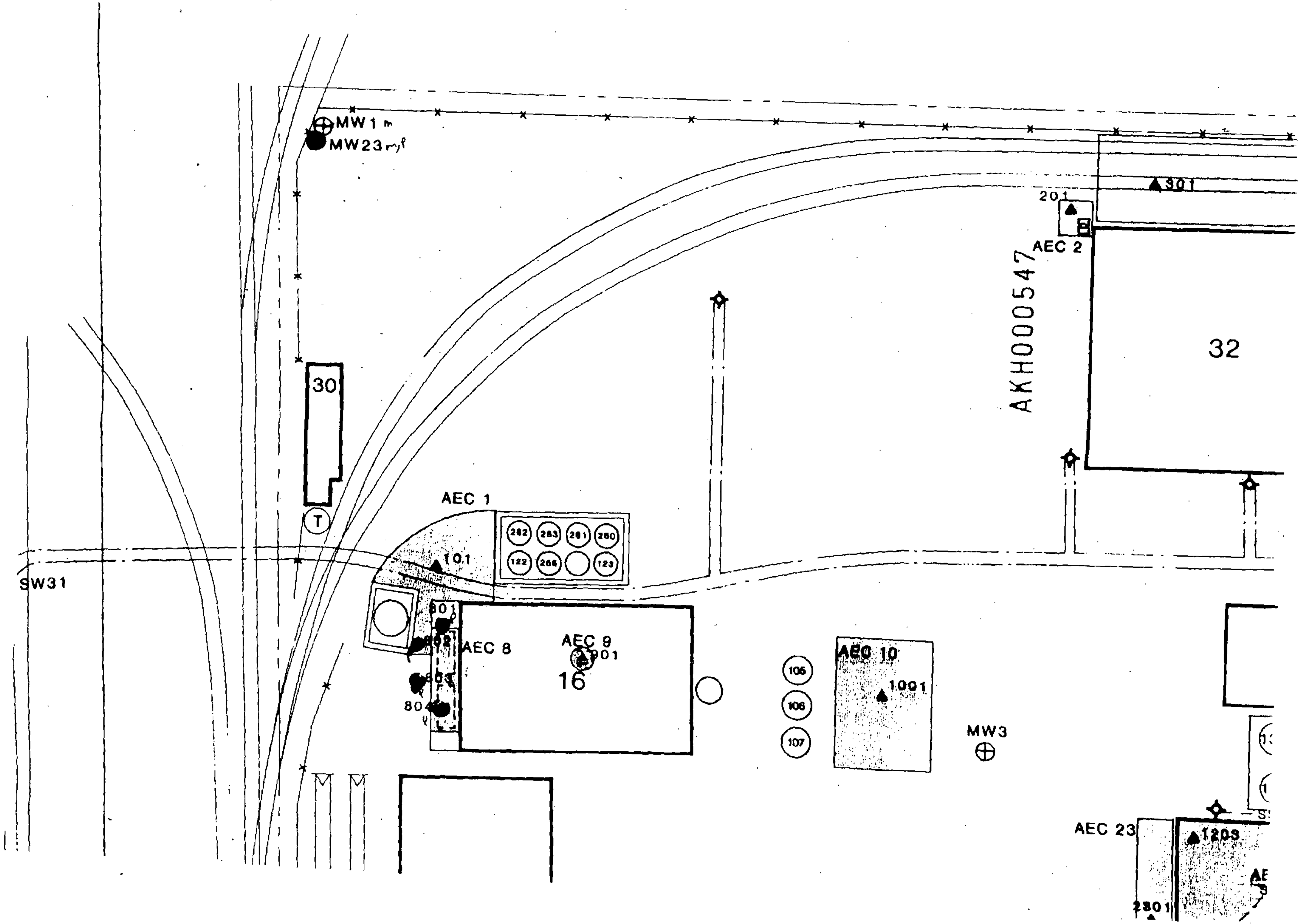

201
301
AEC 2
32
2
AEC 10
1001
105
106
107
MW3
135
133
131
136
134
132
SS
AEC 23
1203
AEC 12
4
2301
1201
1202
SS
SS
SS
AEC 16
1603
1601
1602
309
310
311
C 13
AEC 14
315
1401
1403
1701
1301
1503
1501
1702
AEC 15
306
305
AKH000545

945990348



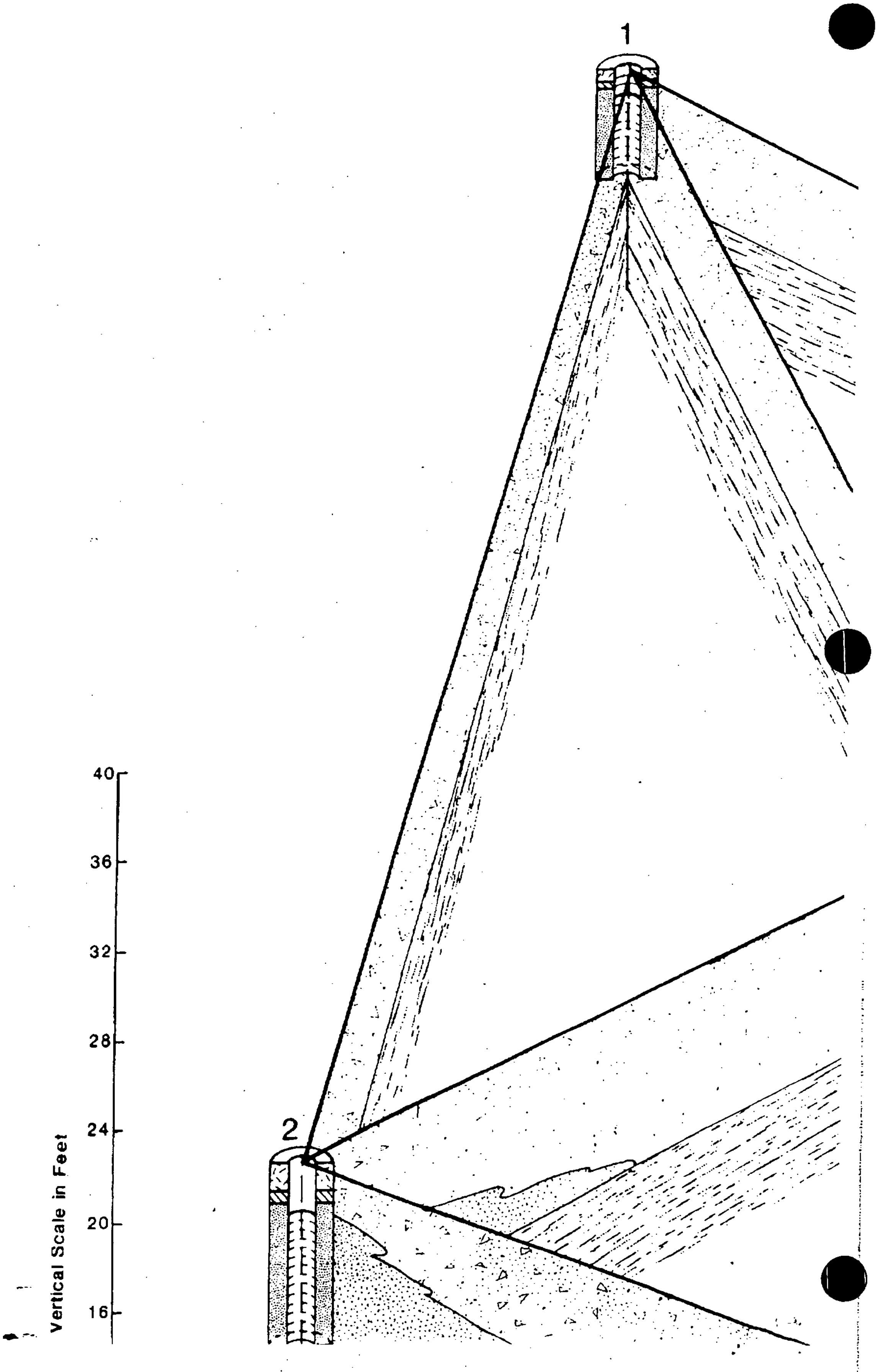
AKH000546

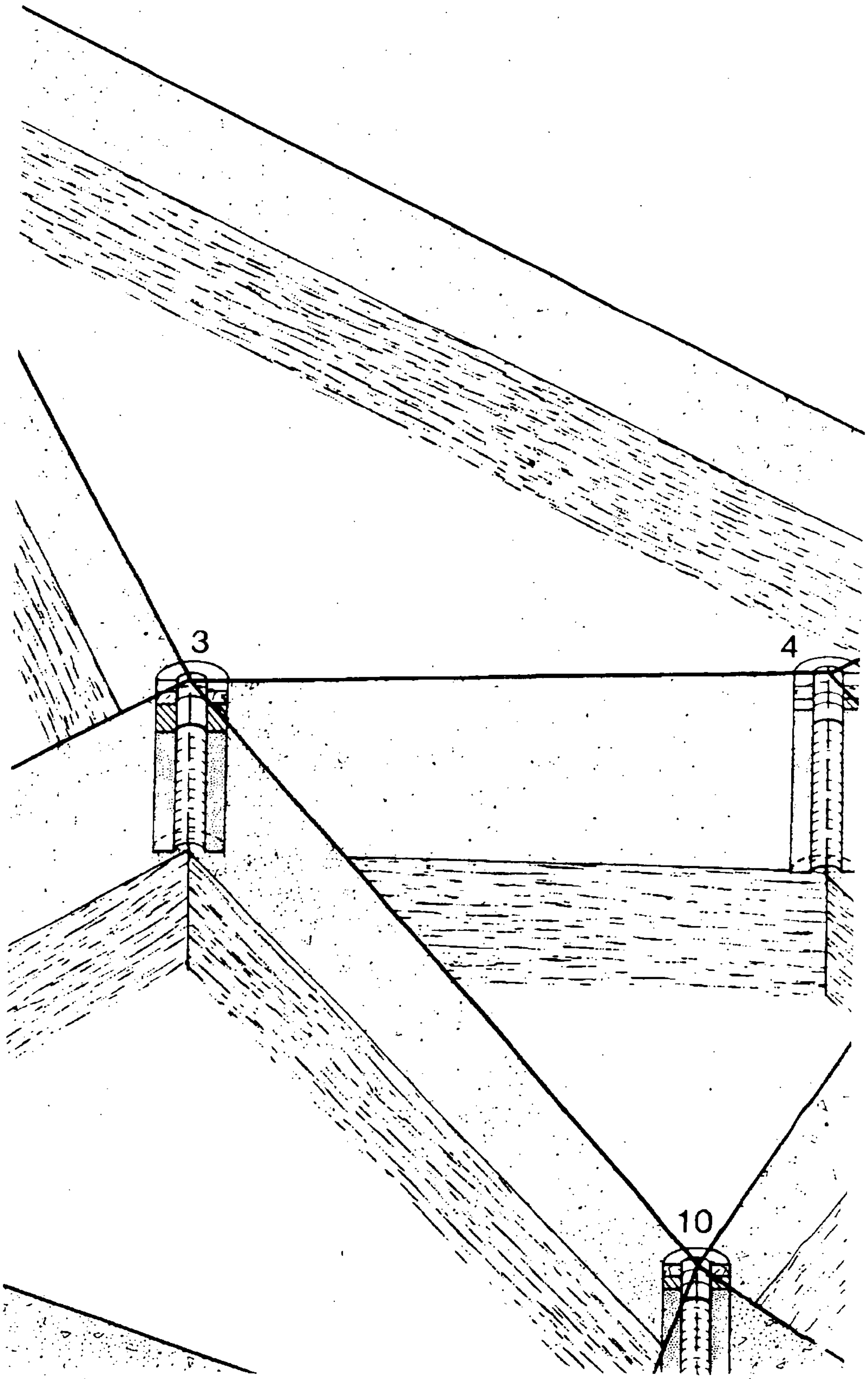
945990349

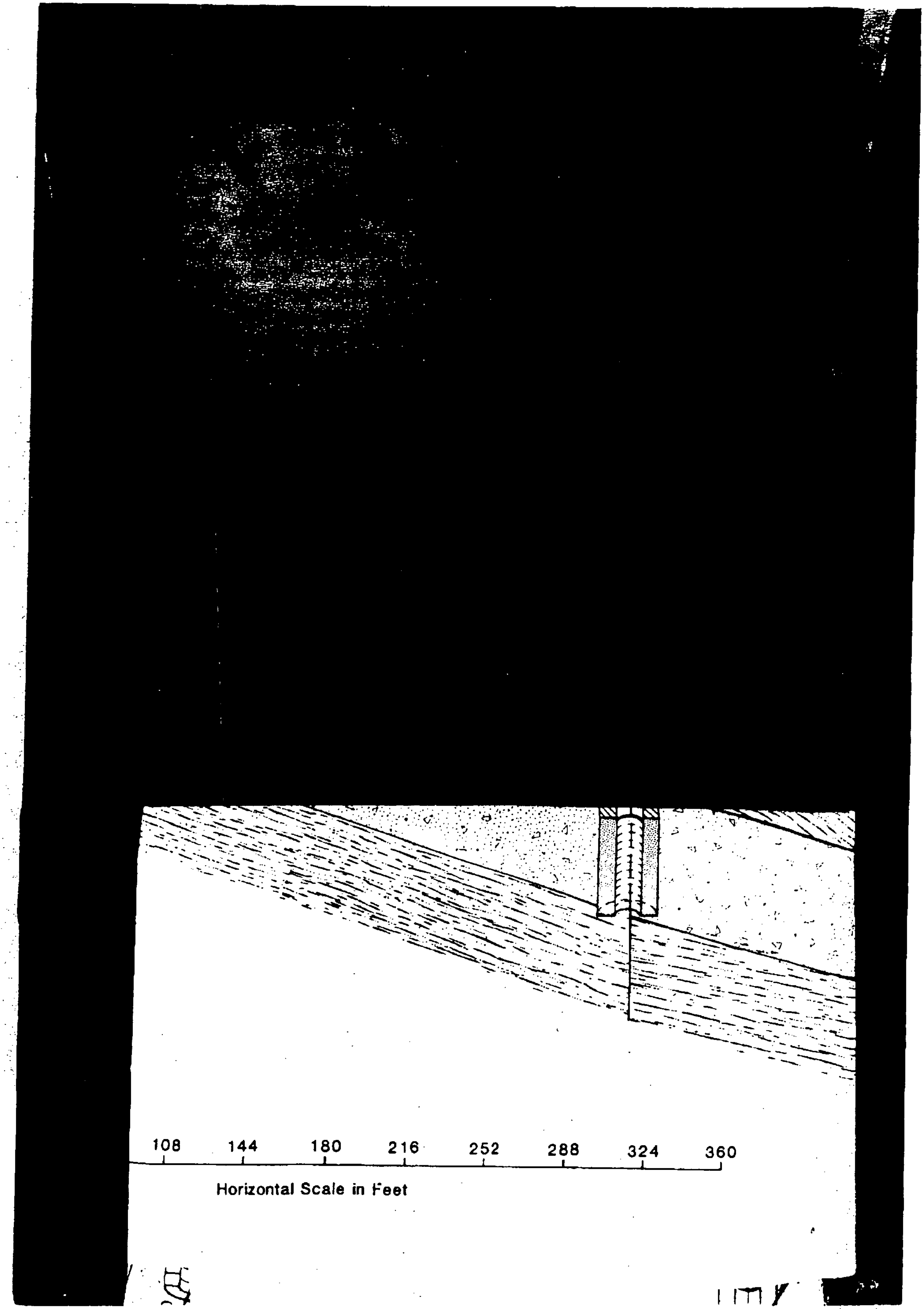


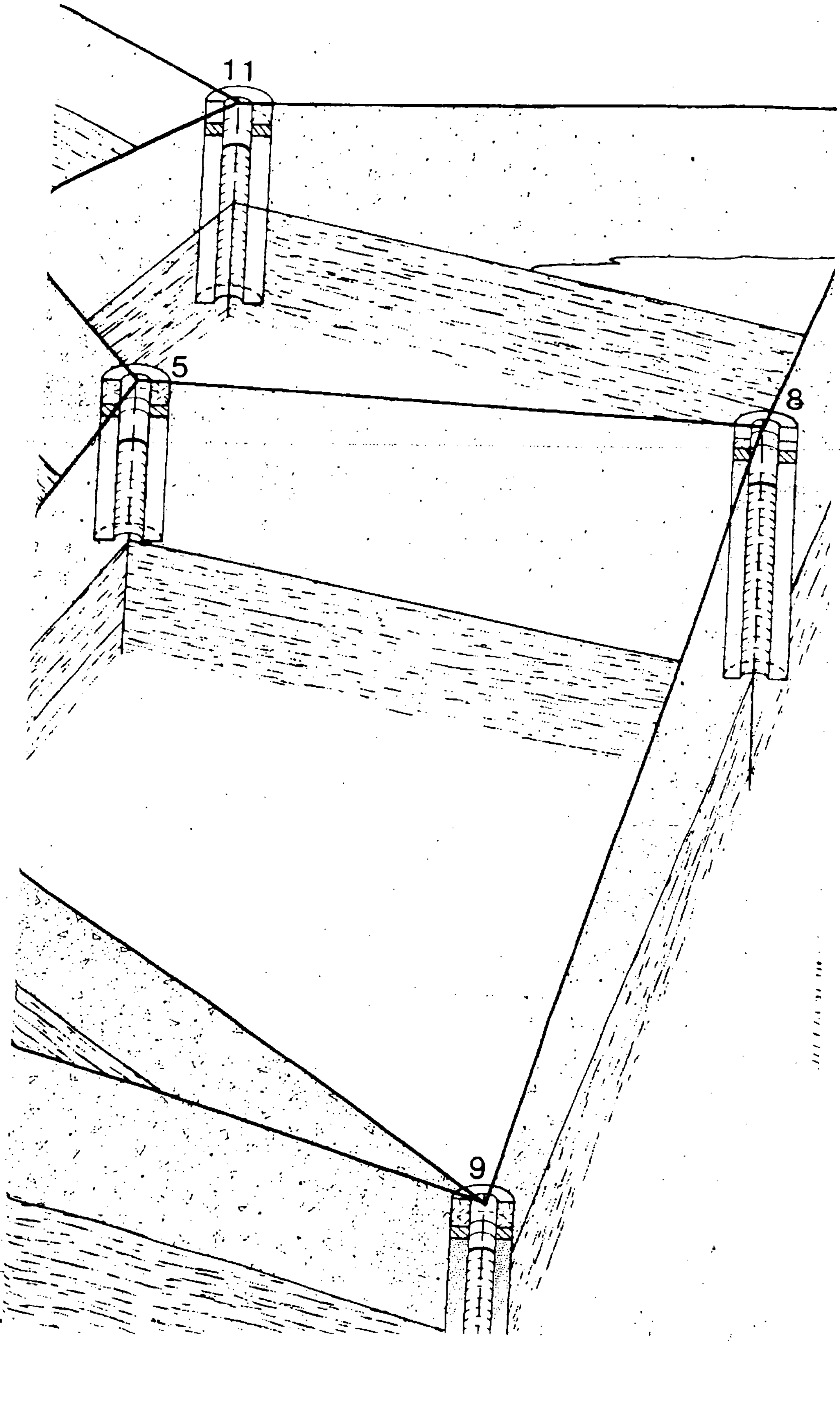
MW1
MW23
30
T
SW31
AEC 1
101
282
283
281
280
122
266
123
801
AEC 8
AEC 9
901
16
105
106
107
AEC 10
1001
MW3
AEC 2
201
301
32
AKH000547
AEC 23
1203
2801

945990350


1
2
40
36
32
28
24
20
16
Vertical Scale in Feet


3
4
10


108 144 180 216 252 288 324 360
Horizontal Scale in Feet


11
5
8
9

Presentation of the
ECRA Sampling Plan Results
for
SPENCER KELLOGG
FORMERLY A DIVISION OF TEXTRON INC.
400 Doremus Avenue
Newark, Essex County
New Jersey

Volume II of IV

Summary of Pertinent Analytical Results
as
Related to Areas of Environmental Concern
and
Quality Assurance/Quality Control Results

ECRA Case No. 85403

March, 1987

Prepared for:

Textron Inc.
Providence, Rhode Island 02903

Prepared by:

ENVIRON Corporation
210 Carnegie Center
Princeton, New Jersey 08540

AKH000552

945990355

Presentation of the ECRA Sampling Plan Results
for Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

ECRA Case No. 85403

VOLUME II - Summary of Pertinent Analytical Results as Related to Areas of Environmental Concern (AECs) and Quality Assurance/Quality Control Results

TABLE OF CONTENTS

Presentation of the ECRA Sampling Plan Results
for Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

ECRA Case No. 85403

VOLUME II - Summary of Pertinent Analytical Results as Related to Areas of Environmental Concern (AECs)
and Quality Assurance/Quality Control Results

TABLE OF CONTENTS (continued)

AKH000554

Presentation of the ECRA Sampling Plan Results
for Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

ECRA Case No. 85403

VOLUME II - Summary of Pertinent Analytical Results as Related to Areas of Environmental Concern (AECs) and Quality Assurance/Quality Control Results

<u>TABLE OF CONTENTS</u> (continued)

AKH000555

945990358

FM [illegible]00699

INTRODUCTION

This report contains a summary of data pertinent to the text of this report as presented in Volume I. The data presented in Tables II-2 through II-35 are primarily organized according to the Areas of Environmental Concern (AECs) described in the text. These data were summarized from Volumes III and IV, Compilation of Analytical Results, with the following exceptions:

- The results of acid extractable, base neutral, polycyclic aromatic hydrocarbon and volatile organic compound analyses have been summed and reported as Total AE, Total BN, Total PAH and Total VOC, respectively.

- The ENVIRON data reporting designation "C" denotes analytical results which have been corrected for method blank contamination. A full description of this practice is presented in Volume I.

- The ENVIRON data reporting designation "E" denotes specific contaminants identified in the volatile and extractable organic analyses for which the laboratory has reported only "estimated" concentrations. These data have not been incorporated in Total VOC, Total AE or Total BN designations because of this estimate.

Also included in this report are tables pertaining to Quality Assurance/Quality Control (QA/QC). These include duplicates, wash blanks and field blanks. Trip blanks were also collected at Textron during Phase One sampling, and were analyzed for volatile organic compounds. No volatile contaminants were detected. (Trip blanks were collected on November 13, 18, 19, 20, 21, 22, 1986, and December 12, 1986, and were labeled TB1113, TB1118, TB1119, TB1120, TB1121, TB1122 and TB1212, respectively.)

FN[illegible]00701

AKH000557

945990360

TABLE II-1

DESCRIPTION OF CENTURY LABORATORIES DATA
REPORTING QUALIFIERS AND ENVIRON DATA REPORTING DESIGNATIONS

Data Reporting Qualifier	Century Laboratories Description
*	Indicates insufficient sample volume was available for requested analysis.
U	Indicates compound was analyzed for but not detected (e.g. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

Data Reporting Qualifier	ENVIRON Description
C	Denotes analytical results which have been corrected for method blank contamination. A full description of this practice is presented in Volume I.
E	Denotes specific contaminants identified in the volatile and extractable organic analyses for which the laboratory has reported only estimated concentrations. These data have not been incorporated in Total VOC, Total AE or Total BN designations because of this estimate.
MW	Monitoring Well
NA	Not Applicable
ND	Not Detected
AE	Acid Extractable Organic Compounds
BN	Base Neutral Organic Compounds
VOC	Volatile Organic Compounds
PAH	Polycyclic Aromatic Hydrocarbons
SW	Surface Water
HSAB	Hollow Stem Auger Boring
--	Analysis Not Requested

FMT000703

945990362

Table II-1

Summary of Analytical Results for AEC 01

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis						
Matrix:	Soil		Soil		Soil	
Sample ID:	288E-0101-01		288E-0101-02		288E-0101-03	
Depth (ft):	0.5-1.5		0.5-1.5		3.5-4.0	
Units:	ppb		ppb		ppb	
Total VOC	ND		ND		ND	
Ethylbenzene	31,000	E	32,000	E	ND	
Toluene	7,800	E	8,100	E	3,600	E

AKH000560

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-2

Summary of Analytical Results for AEC 02

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	
	Sample ID:	288E-0201-01	
	Depth (ft):	0.5-1.5	
	Units:	ppb	
Total VOC		221	
Benzene		28	
Methylene Chloride		120	
Toluene		73	C

AKH000561

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990364

Table II-3

Summary of Analytical Results for AEC 03

Spencer Kellogg, Formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: / Sample ID: / Depth (ft): / Units:	Soil 288E-0301-01 0.5-1.5 ppb		Soil 288E-0302-01 0.5-1.5 ppb		Soil 288E-0303-01 0.5-1.5 ppb	
Petroleum Hydrocarbons		57,000,000		2,040,000		39,400,000	
Total VOC		2,629,077		50,077		1,869,319	
Ethylbenzene		1,999,769	C	34,769	C	1,200,000	
Toluene		629,308	C	15,308	C	669,319	C

See Table II-1 for data reporting qualifiers, designations and abbreviations.

AKH000562

945990365

Table II-4

Summary of Analytical Results for AEC 04

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: / Sample ID: / Depth (ft): / Units:	Soil 288E-0401-01 0.0-1.0 ppb		Soil 288E-0401-02 1.0-2.0 ppb		Soil 288E-0402-01 0.0-0.5 ppb		Soil 288E-0402-02 0.0-0.5 ppb	Soil 288E-0402-03 2.0-3.0 ppb	
Petroleum Hydrocarbons		20,700,000		2,070,000		2,760,000		3,580,000	2,400,000	
Total VOC		849,077		359,319		28,073		--	15,873	
Ethylbenzene		679,769	C	170,000		7,500		--	12,000	
Toluene		169,308	C	189,319	C	19,573	C	--	3,873	C

AKH000563

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990366

Table II-5

Summary of Analytical Results for AEC 06

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis			
	Matrix:	Soil	Water
	Sample ID:	288E-0601-01	288E-MW11
	Depth (ft):	1.0-2.0	NA
Analysis	Units:	ppb	ppb
Petroleum Hydrocarbons		290,000	<500
Total VOC		--	133
Benzene		--	15
Toluene		--	110
Ethylbenzene		--	8
Total PAH		3,724	--
Total AE		--	21
Chloride		--	800,000

AKH000564

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-6

Summary of Analytical Results for AEC 07

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Water
	Sample ID:	288E-0701-01		288E-MW08-01		288E-MW08
	Depth (ft):	0.5-1.5		1.0-2.0		NA
	Units:	ppb		ppb		ppb
Total VOC		6,100		217		ND
Ethylbenzene		6,100		61		ND
Toluene		3,300	E	156	C	ND
Chloride		--		--		3,100,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

AKH000565

945990368

Table II-7

Summary of Analytical Results for AEC 08

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil	Soil	Soil	Soil
	Sample ID:	288E-0801-01	288E-0802-01	288E-0802-02	288E-0803-01	288E-0804-01
	Depth (ft):	2.0-2.5	2.5-3.0	2.5-3.0	2.5-3.0	2.0-2.5
	Units:	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		13,500,000	1,760,000	3,200,000	10,900,000	35,700
Total PAH		7,300	540	--	23,200	490

AKH000566

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-8

Summary of Analytical Results for AEC 09

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis		
	Matrix:	Soil
	Sample ID:	288E-0901-01
	Depth (ft):	0.8-1.0
Analysis	Units:	ppb
Total VOC		869,398
Toluene		869,398 C

AKH000567

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-9

Summary of Analytical Results for AEC 10

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis							
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Water
Sample ID:	288E-1001-01	288E-1001-01	288E-1001-02	288E-MW03-01	288E-MW03-01	288E-MW03-02	288E-MW03
Depth (ft):	0.0-1.0	1.0-2.0	4.0-6.0	0.5-1.5	1.5-2.0	4.0-5.0	NA
Units:	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons	24,300,000	--	666,000	16,000,000	--	3,700,000	<500
Total VOC	--	20	154	--	33	20	ND
Toluene	--	20 C	59 C	--	7 C	5 C	ND
Ethylbenzene	--	ND	36	--	26	15	ND
Methylene chloride	--	ND	69	--	ND	ND	ND
Chloride	--	--	--	--	--	--	300,000

AKH000568

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990371

Table II-10

Summary of Analytical Results for AEC 11

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis				
	Matrix:	Soil	Soil	Water
	Sample ID:	288E-MW05-01	288E-MW05-01	288E-MW05
	Depth (ft):	0.5-1.0	1.0-1.5	NA
Analysis	Units:	ppb	ppb	ppb
Petroleum Hydrocarbons		341,000	--	<500
Total VOC		--	17	ND
Toluene		--	17 C	ND
Chloride		--	--	400,000

AKH000569

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990372

Table II-11

Summary of Analytical Results for AEC 12

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: / Sample ID: / Depth (ft): / Units:	Soil 288E-1201-01 0.0-0.5 ppb	Soil 288E-1201-02 0.5-1.0 ppb		Soil 288E-1202-01 0.0-0.5 ppb	Soil 288E-1202-02 0.4-0.7 ppb		Soil 288E-1203-01 0.0-0.5 ppb	
Petroleum Hydrocarbons		280,000,000	--		170,000,000	--		33,000,000	
Total VOC		--	654,002		--	11,738,002		200,000	
Ethylbenzene		--	590,000		--	11,000,000		200,000	
Toluene		--	64,002	C	--	738,002	C	22,000	E

AKH000570

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990373

Table II-12

Summary of Analytical Results for AEC 13

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis				
	Matrix:	Soil	Soil	Soil
	Sample ID:	288E-1301-01	288E-1302-01	288E-1303-01
	Depth (ft):	0.5-1.5	0.5-1.5	0.5-1.0
Analysis	Units:	ppb	ppb	ppb
Petroleum Hydrocarbons		796,000	551,000	254,000
Total VOC		ND	77	54
Ethylbenzene		ND	14	ND
Toluene		ND	63 C	54 C

AKH000571

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990374

Table II-13

Summary of Analytical Results for AEC 14

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis						
Matrix:	Soil		Soil		Soil	
Sample ID:	288E-1401-01		288E-1402-01		288E-1403-01	
Depth (ft):	0.5-1.5		0.5-1.5		0.5-1.5	
Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons	427,000		8,040,000		<42,000	
Total VOC	74,495		1,349,206		7,770	
Ethylbenzene	69,000		679,836	C	2,800	
Toluene	5,495	C	669,370	C	4,970	C

AKHC0057

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-14

Summary of Analytical Results for AEC 15

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Soil
	Sample ID:	288E-1501-01		288E-1503-01		288E-1504-01
	Depth (ft):	0.5-1.5		0.5-1.5		1.0-1.5
	Units:	ppb		ppb		ppb
Petroleum Hydrocarbons		640,000		50,900		375,000
Total VOC		ND		1,709		ND
Toluene		ND	C	819	C	ND
Ethylbenzene		ND		890		ND

AKH000573

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-15

Summary of Analytical Results for AEC 16

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Soil	
	Sample ID:	288E-1601-01		288E-1602-01		288E-1603-01	
	Depth (ft):	1.0-1.5		1.0-1.5		1.0-1.5	
	Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons		1,020,000		1,090,000		5,670,000	
Total VOC		16,000		100,000		869,861	
Ethylbenzene		16,000		100,000		730,000	
Toluene		3,400	E	13,000	E	139,861	C

AKH000574

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-16

Summary of Analytical Results for AEC 17

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis	Matrix:	Soil		Soil		Soil		Soil		Soil		Water
	Sample ID:	288E-1701-01		288E-1502-01		288E-1703-01		288E-MW10-01		288E-MW10-02		288E-MW10
	Depth (ft):	1.0-1.5		0.5-1.5		1.0-1.5		0.5-1.5		4.0-5.0		NA
	Units:	ppb		ppb		ppb		ppb		ppb		ppb
Petroleum Hydrocarbons		1,390,000		157,000		80,900		710,000		1,900,000		<500
Total VOC		248		87		173		3,889,398		494,398		34,180
Ethylbenzene		120		ND		72		490,000		45,000		180
Toluene		128	C	87	C	101	C	3,399,398	C	449,398	C	34,000
Total AE		--		--		--		ND		ND		ND
Total BN		--		--		--		274,360		22,000		9
Chloride		--		--		--		--		--		90,000

AKH000575

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990378

Table II-17

Summary of Analytical Results for AEC 18

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil
	Sample ID:	288E-1801-01
	Depth (ft):	1.0-1.5
	Units:	ppb
Petroleum Hydrocarbons		767,000

AKH000576

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-18

Summary of Analytical Results for AEC 19

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis	Matrix:	Soil	Soil		Soil	
	Sample ID:	288E-1901-01	288E-1901-01		288E-1901-02	
	Depth (ft):	0.6-1.5	1.0-1.5		2.0-2.5	
	Units:	ppb	ppb		ppb	
Petroleum Hydrocarbons		5,080,000	--		17,500,000	
Total VOC		--	79,998		980,000	
Ethylbenzene		--	54,000		980,000	
Toluene		--	25,998	C	140,000	E

See Table II-1 for data reporting qualifiers, designations and abbreviations.

AKH000577

945990380

Table II-19

Summary of Analytical Results for AEC 20

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: Soil	Soil		Water	Water
	Sample ID: 288E-MW09-01	288E-MW09-02		288E-MW09	288E-MW109
	Depth (ft): 0.0-1.5	2.0-3.5		NA	NA
	Units: ppb	ppb		ppb	ppb
Petroleum Hydrocarbons	2,780,000	3,640,000		<500	<500
Total VOC	ND	6		ND	--
Toluene	ND	6	C	ND	--
Total AE	ND	ND		--	--
Total BN	27,370	22,690		--	--
Chloride	--	--		45,000	45,000
Cyanide	<110	<130		--	--
Phenols	<110	<130		--	--
PCBs	ND	ND		--	--
Pesticides	ND	ND		--	--
Antimony	<13,100	<15,500		--	--
Arsenic	14,000	13,700		--	--
Beryllium	<1,090	<1,290		--	--
Cadmium	1,630	4,810		--	--
Chromium	14,500	41,600		--	--
Copper	120,000	256,000		--	--
Lead	181,000	463,000		306	--
Mercury	66	5,660		--	--
Nickel	15,600	27,300		--	--
Selenium	<1,090	1,290		--	--
Silver	<2,180	<2,580		--	--
Thallium	<2,180	<2,580		--	--
Zinc	421,000	723,000		--	--

AKH000578

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-20

Summary of Analytical Results for AEC 21

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis	Matrix:	Soil		Soil		Soil	
	Sample ID:	288E-2101-01		288E-2102-01		288E-2103-01	
	Depth (ft):	0.5-1.5		0.5-1.5		1.0-1.5	
	Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons		14,140,000		1,220,000		3,960,000	
Total VOC		3,099,600		5,918		752,600	
Ethylbenzene		1,900,000		5,800		680,000	
Toluene		1,199,600	C	118	C	72,600	C

AKH000579

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-21

Summary of Analytical Results for AEC 22

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: / Sample ID: / Depth (ft): / Units:	Soil / 288E-2201-01 / 0.5-1.0 / ppb	
	Matrix:	Soil	
	Sample ID:	288E-2201-01	
	Depth (ft):	0.5-1.0	
	Units:	ppb	
Petroleum Hydrocarbons		440,000	
Total VOC		2,771	
Chloroform		1,342	C
Ethylbenzene		597	C
Toluene		832	C

AKH000580

See Table II-1 for data reporting qualifiers, designations and abbreviations.

045990383

Table II-22

Summary of Analytical Results for AEC 23

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis	Matrix:	Soil	Soil	Soil	
	Sample ID:	288E-2301-01	288E-2301-01	288E-2301-02	
	Depth (ft):	1.0-1.5	0.5-1.0	2.0-2.5	
	Units:	ppb	ppb	ppb	
Petroleum Hydrocarbons		7,450,000	--	2,600,000	
Total VOC		--	860	2,597	
Ethylbenzene		--	860	1,500	
Toluene		--	ND	1,097	C

AKH0005817

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-23

Summary of Analytical Results for AEC 25

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis		
	Matrix:	Soil
	Sample ID:	288E-2501-01
	Depth (ft):	0.5-1.5
Analysis	Units:	ppb
Petroleum Hydrocarbons		608,000
Total VOC		140,000
Toluene		140,000
Ethylbenzene		42,000 E

AKH000582

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-24

Summary of Analytical Results for AEC 27

Analysis	Matrix:	Soil
	Sample ID:	288E-2701-01
	Depth (ft):	1.0-1.5
	Units:	ppb
Petroleum Hydrocarbons		ND
Total VOC		ND

AKH000583

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-25

Summary of Analytical Results for AEC 28

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	
Matrix:	Soil
Sample ID:	28BE-2801-01
Depth (ft):	1.0-1.5
Units:	ppb
Petroleum Hydrocarbons	314,000
Total VOC	ND

AKH000584

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-26

Summary of Analytical Results for MW01

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil	Water
	Sample ID:	288E-MW01-02		288E-MW01-03	288E-MW01
	Depth (ft):	1.5-2.5		1.5-2.5	NA
	Units:	ppb		ppb	ppb
Petroleum Hydrocarbons		5,080,000		3,780,000	<500
Total VOC		63		ND	ND
Toluene		63	C	ND	ND
Total AE		ND		ND	--
Total BN		516		3,140	--
Chloride		--		--	500,000
Cyanide		420		<130	--
Phenols		170		<130	--
PCBs		ND		ND	--
Pesticides		ND		ND	--
Antimony		<11,500		<14,000	--
Arsenic		17,040		8,390	--
Beryllium		<957		<1,160	--
Cadmium		1,350		<1,160	--
Chromium		10,800		9,060	--
Copper		36,500		47,800	--
Lead		59,900		86,800	--
Mercury		212		166	--
Nickel		6,640		7,300	--
Selenium		<957		<1,160	--
Silver		<1,910		<2,330	--
Thallium		<1,910		<2,330	--
Zinc		116,000		81,800	--

AKH000585

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990388

Table II-27

Summary of Analytical Results for MW02

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis		
	Matrix:	Water
	Sample ID:	288E-MW02
	Depth (ft):	NA
Analysis	Units:	ppb
Petroleum Hydrocarbons		70,000
Total VOC		ND
Chloride		200,000

AKH000586

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-28

Summary of Analytical Results for MW04

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis						
	Matrix:	Soil		Soil		Water
	Sample ID:	288E-MW04-01		288E-MW04-02		288E-MW04
	Depth (ft):	0.5-1.0		3.0-3.5		NA
Analysis	Units:	ppb		ppb		ppb
Total VOC		359		750		ND
Ethylbenzene		45		220		ND
Toluene		235	C	90	C	ND
Methylene chloride		79		460		ND
Chloride		--		--		1,700,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

AKH000587

945990390

Table II-29

Summary of Analytical Results for MW06

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Water	Water
	Sample ID:	288E-MW06-01		288E-MW06-02		288E-MW06	288E-MW106
	Depth (ft):	1.0-2.0		6.0-7.0		NA	NA
	Units:	ppb		ppb		ppb	ppb
Petroleum Hydrocarbons		240,000		940,000		<500	<500
Total VOC		7,501		10,790		ND	28
Chloroform		1,788	C	2,894	C	ND	ND
Ethylbenzene		928	C	ND		ND	ND
Toluene		4,785	C	7,896	C	ND	28
Total AE		ND		ND		--	--
Total BN		8,652		142,500		7	6
Chloride		--		--		55,000	50,000
Cyanide		*		<160		27	24
Phenols		<120		<160		18	20
PCBs		ND		ND		ND	ND
Pesticides		ND		ND		ND	ND
Antimony		<15,200		<17,200		<60	<60
Arsenic		9,910		14,100		16	11
Beryllium		<1,270		<1,400		<5	<5.0
Cadmium		1,930		7,350		11	7.5
Chromium		15,700		21,900		13	14
Copper		152,000		397,000		167	119
Iron		--		--		75,000	486,000
Lead		504,000		878,000		521	354
Mercury		317		5,210		<0.2	1.2
Nickel		19,300		21,900		<20	<20
Selenium		<1,270		<1,430		<5	5
Silver		<2,530		<2,860		<10	<10
Thallium		<2,540		<2,870		<10	<10
Zinc		473,000		1,188,000		562	388

AKH000588

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-30

Summary of Analytical Results for MW07

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil	Soil	Water
	Sample ID:	288E-MW07-01	288E-MW07-01	288E-MW07-02	288E-MW07
	Depth (ft):	0.5-1.0	1.0-1.5	4.0-6.0	NA
	Units:	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		2,400,000	--	1,360,000	<500
Total VOC		--	677	1,727	128
Ethylbenzene		--	ND	31	8
Toluene		--	677 C	1,696 C	120
Chloride		--	--	--	4,200,000

AKH000589

See Table II-1 for data reporting qualifiers, designations and abbreviations.

945990392

Table II-31

Summary of Analytical Results for MW21

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil	Water
	Sample ID:	288E-MW21-01	288E-MW21-02	288E-MW21
	Depth (ft):	0.0-1.5	31.0-32.0	NA
	Units:	ppb	ppb	ppb
Petroleum Hydrocarbons		2,820,000	<36,000	<500
Total VOC		ND	ND	ND
Total AE		ND	ND	ND
Total BN		1,090	343	24
Phenols		<120	<120	30
Chloride		--	--	4,700,000
Cyanide		<120	<120	<10
PCBs		ND	ND	ND
Pesticides		ND	ND	ND
Antimony		<14,600	<15,400	<60
Arsenic		12,700	4,890	<3
Beryllium		<1,220	<1,280	<5
Cadmium		2,410	1,540	<5
Chromium		22,200	18,950	<10
Copper		388,000	7,340	11
Lead		256,000	2,830	<5
Mercury		323	166	1.1
Nickel		24,600	8,050	<20
Selenium		<1,220	<1,290	<5
Silver		<2,430	<2,570	<10
Thallium		<2,430	<2,575	<10
Zinc		299,000	42,600	66

AKH000590

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-32

Summary of Analytical Results for MW22

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil	Water	Water
	Sample ID:	288E-MW22-01		288E-MW22-03	288E-MW22(12/18/86)	288E-MW22(12/31/86)
	Depth (ft):	2.0-4.0		27.0-27.5	NA	NA
	Units:	ppb		ppb	ppb	ppb
Petroleum Hydrocarbons		--		<42,000	--	--
Total VOC		9,142		--	216	146
Chloroform		2,340	C	--	ND	ND
Ethylbenzene		1,300		--	210	140
Toluene		5,502	C	--	6	6
Chloride		--		--	5,150,000	4,400,000

AKH000591

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-33

Summary of Analytical Results for MW23

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

Analysis	Matrix:	Soil		Soil		Soil	Water
	Sample ID:	288E-MW23-01		288E-MW23-02		288E-MW23-03	288E-MW23
	Depth (ft):	0.5-1.0		2.0-3.0		23.0-24.0	NA
	Units:	ppb		ppb		ppb	ppb
Petroleum Hydrocarbons		39,800		54,000		<47,600	<500
Total VOC		187		84		--	ND
Ethylbenzene		31		ND		--	ND
Toluene		156	C	84	C	--	ND
Total AE		ND		ND		ND	ND
Total BN		1,220		20,290		570	10
Chloride		--		--		--	4,800,000
Cyanide		<130		<150		<160	<10
Phenols		<130		<150		<160	180
PCBs		ND		ND		ND	ND
Pesticides		ND		ND		ND	ND
Antimony		<15,100		<18,800		<14.1	<60
Arsenic		22,200		38,000		3.29	6
Beryllium		<1,260		<1,560		<1.2	<5.0
Cadmium		1,710		2,220		<1.2	6.8
Chromium		9,410		16,400		10.9	11
Copper		51,700		65,600		5.24	72
Lead		96,700		40,250		80.5	<5.0
Mercury		318		204		<0.1	<0.2
Nickel		7,250		16,400		4.92	<20
Selenium		<1,260		<1,560		<1.2	<5.0
Silver		<2,520		<3,130		<2.4	<10
Thallium		<2,530		<3,130		<2.4	<10
Zinc		90,100		224,000		19.04	50

AKH000592

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-34

Summary of Analytical Results for Surface Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Water	Water	Water	Water
	Sample ID:	288E-SW31-01	288E-SW31-02	288E-SW31-03	288E-SW32-02	288E-SW33-02
	Depth (ft):	NA	NA	NA	NA	NA
Analysis	Units:	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		112,000	--	<500	<500	--
Total VOC		91	--	73	282	--
1,1-Dichloroethane		ND	--	11	9	--
Chlorobenzene		72	--	15	12	--
Ethylbenzene		ND	--	ND	220	--
Toluene		19 C	--	18 C	20 C	--
trans-1,2-Dichloroethane		ND	--	13	11	--
Methylene chloride		ND	--	12	10	--
1,1,1-Trichloroethane		ND	--	41	ND	--
Total AE		ND	--	ND	ND	--
Total BN		15,970	--	7	18	--
Chloride		--	320,000	--	450,000	1,800,000
Cyanide		<200	--	32	26	--
Phenols		450	--	80	170	--
PCBs		ND	--	ND	ND	--
Pesticides		ND	--	ND	ND	--
Antimony		<23,600	--	<60	<60	--
Arsenic		19,300	--	4	6	--
Beryllium		<1,970	--	<5	<5	--
Cadmium		7,480	--	16	26	--
Chromium		126,000	--	24	25	--
Copper		152,000	--	20	21	--
Lead		585,000	--	137	140	--
Mercury		1,015	--	<0.2	0.5	--
Nickel		45,300	--	49	44	--
Selenium		<1,970	--	<5	<5	--
Silver		5,320	--	11	12	--
Thallium		<3,940	--	<10	<10	--
Zinc		736,000	--	188	169	--

See Table II-1 for data reporting qualifiers, designations and abbreviations.

AKH000595

945990396

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-0701-02	NA	Wash Blank	Total AE	ND	
288E-0701-02	NA	Wash Blank	Total BN	ND	
288E-0701-02	NA	Wash Blank	Antimony	<60	
288E-0701-02	NA	Wash Blank	Arsenic	<2	
288E-0701-02	NA	Wash Blank	Beryllium	<5	
288E-0701-02	NA	Wash Blank	Cadmium	<5	
288E-0701-02	NA	Wash Blank	Chromium	<10	
288E-0701-02	NA	Wash Blank	Copper	<10	
288E-0701-02	NA	Wash Blank	Lead	<5	
288E-0701-02	NA	Wash Blank	Mercury	<0.2	
288E-0701-02	NA	Wash Blank	Nickel	<20	
288E-0701-02	NA	Wash Blank	Selenium	<5	
288E-0701-02	NA	Wash Blank	Silver	<10	
288E-0701-02	NA	Wash Blank	Thallium	<10	
288E-0701-02	NA	Wash Blank	Zinc	<10	
288E-0701-02	NA	Wash Blank	Cyanide	<10	
288E-0701-02	NA	Wash Blank	Petroleum Hydrocarbons	*	
288E-0701-02	NA	Wash Blank	Phenols	<10	
288E-0701-02	NA	Wash Blank	Toluene	2	
288E-0701-02	NA	Wash Blank	Total VOC	2	
288E-1901-03	1901	Wash Blank	Total AE	ND	
288E-1901-03	1901	Wash Blank	Total BN	ND	
288E-1901-03	1901	Wash Blank	PCBs	ND	

AKH000594

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-1901-03	1901	Wash Blank	Pesticides	ND	
288E-1901-03	1901	Wash Blank	Antimony	<60	
288E-1901-03	1901	Wash Blank	Arsenic	<2	
288E-1901-03	1901	Wash Blank	Beryllium	<5	
288E-1901-03	1901	Wash Blank	Cadmium	<5	
288E-1901-03	1901	Wash Blank	Chromium	<10	
288E-1901-03	1901	Wash Blank	Copper	<10	
288E-1901-03	1901	Wash Blank	Lead	<5	
288E-1901-03	1901	Wash Blank	Mercury	<0.2	
288E-1901-03	1901	Wash Blank	Nickel	<20	
288E-1901-03	1901	Wash Blank	Selenium	<5	
288E-1901-03	1901	Wash Blank	Silver	<10	
288E-1901-03	1901	Wash Blank	Thallium	<10	
288E-1901-03	1901	Wash Blank	Zinc	13	
288E-1901-03	1901	Wash Blank	Cyanide	<10	
288E-1901-03	1901	Wash Blank	Petroleum Hydrocarbons	*	
288E-1901-03	1901	Wash Blank	Phenols	<10	
288E-FB-1218	NA	Field Blank	Total AE	ND	
288E-FB-1218	NA	Field Blank	Total BN	ND	
288E-FB-1218	NA	Field Blank	PCBs	ND	
288E-FB-1218	NA	Field Blank	Pesticides	ND	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

AKH000595

945990398

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-0701-02	NA	Wash Blank	Total AE	ND	
288E-0701-02	NA	Wash Blank	Total BN	ND	
288E-0701-02	NA	Wash Blank	Antimony	<60	
288E-0701-02	NA	Wash Blank	Arsenic	<2	
288E-0701-02	NA	Wash Blank	Beryllium	<5	
288E-0701-02	NA	Wash Blank	Cadmium	<5	
288E-0701-02	NA	Wash Blank	Chromium	<10	
288E-0701-02	NA	Wash Blank	Copper	<10	
288E-0701-02	NA	Wash Blank	Lead	<5	
288E-0701-02	NA	Wash Blank	Mercury	<0.2	
288E-0701-02	NA	Wash Blank	Nickel	<20	
288E-0701-02	NA	Wash Blank	Selenium	<5	
288E-0701-02	NA	Wash Blank	Silver	<10	
288E-0701-02	NA	Wash Blank	Thallium	<10	
288E-0701-02	NA	Wash Blank	Zinc	<10	
288E-0701-02	NA	Wash Blank	Cyanide	<10	
288E-0701-02	NA	Wash Blank	Petroleum Hydrocarbons	*	
288E-0701-02	NA	Wash Blank	Phenols	<10	
288E-0701-02	NA	Wash Blank	Toluene	2	
288E-0701-02	NA	Wash Blank	Total VOC	2	
288E-1901-03	1901	Wash Blank	Total AE	ND	
288E-1901-03	1901	Wash Blank	Total BN	ND	
288E-1901-03	1901	Wash Blank	PCBs	ND	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-1901-03	1901	Wash Blank	Pesticides	ND	
288E-1901-03	1901	Wash Blank	Antimony	<60	
288E-1901-03	1901	Wash Blank	Arsenic	<2	
288E-1901-03	1901	Wash Blank	Beryllium	<5	
288E-1901-03	1901	Wash Blank	Cadmium	<5	
288E-1901-03	1901	Wash Blank	Chromium	<10	
288E-1901-03	1901	Wash Blank	Copper	<10	
288E-1901-03	1901	Wash Blank	Lead	<5	
288E-1901-03	1901	Wash Blank	Mercury	<0.2	
288E-1901-03	1901	Wash Blank	Nickel	<20	
288E-1901-03	1901	Wash Blank	Selenium	<5	
288E-1901-03	1901	Wash Blank	Silver	<10	
288E-1901-03	1901	Wash Blank	Thallium	<10	
288E-1901-03	1901	Wash Blank	Zinc	13	
288E-1901-03	1901	Wash Blank	Cyanide	<10	
288E-1901-03	1901	Wash Blank	Petroleum Hydrocarbons	*	
288E-1901-03	1901	Wash Blank	Phenols	<10	
288E-FB-1218	NA	Field Blank	Total AE	ND	
288E-FB-1218	NA	Field Blank	Total BN	ND	
288E-FB-1218	NA	Field Blank	PCBs	ND	
288E-FB-1218	NA	Field Blank	Pesticides	ND	

AKH000597

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-FB-1218	NA	Field Blank	Antimony	<60	
288E-FB-1218	NA	Field Blank	Arsenic	<3	
288E-FB-1218	NA	Field Blank	Beryllium	<5	
288E-FB-1218	NA	Field Blank	Cadmium	<5	
288E-FB-1218	NA	Field Blank	Chromium	<10	
288E-FB-1218	NA	Field Blank	Copper	<10	
288E-FB-1218	NA	Field Blank	Lead	<5	
288E-FB-1218	NA	Field Blank	Mercury	<0.2	
288E-FB-1218	NA	Field Blank	Nickel	<20	
288E-FB-1218	NA	Field Blank	Selenium	<5	
288E-FB-1218	NA	Field Blank	Silver	<10	
288E-FB-1218	NA	Field Blank	Thallium	<10	
288E-FB-1218	NA	Field Blank	Zinc	29	
288E-FB-1218	NA	Field Blank	Chloride	<1,000	
288E-FB-1218	NA	Field Blank	Cyanide	<10	
288E-FB-1218	NA	Field Blank	Petroleum Hydrocarbons	<500	
288E-FB-1218	NA	Field Blank	Phenols	<10	
288E-FB-1222	NA	Field Blank	Total AE	ND	
288E-FB-1222	NA	Field Blank	Total BN	ND	
288E-FB-1222	NA	Field Blank	Chloride	<1,000	
288E-FB-1222	NA	Field Blank	Petroleum Hydrocarbons	<500	
288E-FB-1222	NA	Field Blank	Total AE	ND	
288E-FB-1222	NA	Field Blank	bis(2-Ethylhexyl)Phthalate	6	
288E-FB-1222	NA	Field Blank	Total BN	6	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

AKH000598

945990401

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-FB-1222	NA	Field Blank	PCBs	ND	
288E-FB-1222	NA	Field Blank	Pesticides	ND	
288E-FB-1222	NA	Field Blank	Antimony	<60	
288E-FB-1222	NA	Field Blank	Arsenic	<3	
288E-FB-1222	NA	Field Blank	Beryllium	<5	
288E-FB-1222	NA	Field Blank	Cadmium	<5	
288E-FB-1222	NA	Field Blank	Chromium	<10	
288E-FB-1222	NA	Field Blank	Copper	<10	
288E-FB-1222	NA	Field Blank	Lead	<5	
288E-FB-1222	NA	Field Blank	Mercury	0.3	
288E-FB-1222	NA	Field Blank	Nickel	<20	
288E-FB-1222	NA	Field Blank	Selenium	<5	
288E-FB-1222	NA	Field Blank	Silver	<10	
288E-FB-1222	NA	Field Blank	Thallium	<10	
288E-FB-1222	NA	Field Blank	Zinc	26	
288E-FB-1222	NA	Field Blank	Chloride	5,000	
288E-FB-1222	NA	Field Blank	Cyanide	<10	
288E-FB-1222	NA	Field Blank	Petroleum Hydrocarbons	<500	
288E-FB-1222	NA	Field Blank	Phenols	<10	
288E-MW06-03	MW06	Wash Blank	Total AE	ND	
288E-MW06-03	MW06	Wash Blank	bis(2-Ethylhexyl)Phthalate	63	
288E-MW06-03	MW06	Wash Blank	Total BN	63	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06-03	MW06	Wash Blank	PCBs	ND	
288E-MW06-03	MW06	Wash Blank	Pesticides	ND	
288E-MW06-03	MW06	Wash Blank	Antimony	<60	
288E-MW06-03	MW06	Wash Blank	Arsenic	8	
288E-MW06-03	MW06	Wash Blank	Beryllium	<5	
288E-MW06-03	MW06	Wash Blank	Cadmium	<5	
288E-MW06-03	MW06	Wash Blank	Chromium	<10	
288E-MW06-03	MW06	Wash Blank	Copper	<10	
288E-MW06-03	MW06	Wash Blank	Lead	8	
288E-MW06-03	MW06	Wash Blank	Mercury	<0.2	
288E-MW06-03	MW06	Wash Blank	Nickel	<20	
288E-MW06-03	MW06	Wash Blank	Selenium	<5	
288E-MW06-03	MW06	Wash Blank	Silver	<10	
288E-MW06-03	MW06	Wash Blank	Thallium	<10	
288E-MW06-03	MW06	Wash Blank	Zinc	36	
288E-MW06-03	MW06	Wash Blank	Cyanide	<10	
288E-MW06-03	MW06	Wash Blank	Petroleum Hydrocarbons	*	
288E-MW06-03	MW06	Wash Blank	Phenols	<10	
288E-MW06-03	MW06	Wash Blank	Chloroform	ND	C
288E-MW06-03	MW06	Wash Blank	Toluene	4	E
288E-MW06-03	MW06	Wash Blank	Total VOC	ND	
288E-MW07-03	MW07	Wash Blank	Petroleum Hydrocarbons	*	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

AKH000600

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW07-03	MW07	Wash Blank	Toluene	4	C
288E-MW07-03	MW07	Wash Blank	Total VOC	4	
288E-MW09-03	MW09	Wash Blank	Total AE	ND	
288E-MW09-03	MW09	Wash Blank	Total BN	ND	
288E-MW09-03	MW09	Wash Blank	PCBs	ND	
288E-MW09-03	MW09	Wash Blank	Pesticides	ND	
288E-MW09-03	MW09	Wash Blank	Antimony	<60	
288E-MW09-03	MW09	Wash Blank	Arsenic	<2	
288E-MW09-03	MW09	Wash Blank	Beryllium	<2	
288E-MW09-03	MW09	Wash Blank	Cadmium	<5	
288E-MW09-03	MW09	Wash Blank	Chromium	<10	
288E-MW09-03	MW09	Wash Blank	Copper	14	
288E-MW09-03	MW09	Wash Blank	Lead	6	
288E-MW09-03	MW09	Wash Blank	Mercury	<0.2	
288E-MW09-03	MW09	Wash Blank	Nickel	<20	
288E-MW09-03	MW09	Wash Blank	Selenium	<5	
288E-MW09-03	MW09	Wash Blank	Silver	<10	
288E-MW09-03	MW09	Wash Blank	Thallium	<10	
288E-MW09-03	MW09	Wash Blank	Zinc	39	
288E-MW09-03	MW09	Wash Blank	Cyanide	<10	
288E-MW09-03	MW09	Wash Blank	Petroleum Hydrocarbons	*	
288E-MW09-03	MW09	Wash Blank	Phenols	<10	

AKH000601

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW11-02	MW11	Wash Blank	Petroleum Hydrocarbons	<250	
288E-MW22-02	NA	Wash Blank	Chloroform	3	
288E-MW22-02	NA	Wash Blank	Ethylbenzene	1	E
288E-MW22-02	NA	Wash Blank	Toluene	4	E
288E-MW22-02	NA	Wash Blank	Total VOC	3	

AKH000602

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-0101-01	0101	HSAB	0.5-1.5	Soil	Ethylbenzene	31,000	E
288E-0101-02	0101	HSAB	0.5-1.5	Soil	Ethylbenzene	33,000	E
288E-0101-01	0101	HSAB	0.5-1.5	Soil	Toluene	7,800	E
288E-0101-02	0101	HSAB	0.5-1.5	Soil	Toluene	8,100	E
288E-0101-01	0101	HSAB	0.5-1.5	Soil	Total VOC	ND	
288E-0101-02	0101	HSAB	0.5-1.5	Soil	Total VOC	ND	
288E-0402-01	0402	HSAB	0.0-0.5	Soil	Petroleum Hydrocarbons	2,760,000	
288E-0402-02	0402	HSAB	0.0-0.5	Soil	Petroleum Hydrocarbons	3,580,000	
288E-0802-01	0802	HSAB	2.5-3.0	Soil	Petroleum Hydrocarbons	1,760,000	
288E-0802-02	0802	HSAB	2.5-3.0	Soil	Petroleum Hydrocarbons	3,200,000	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Acenaphthylene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Acenaphthylene	30	E
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Antimony	<11,500	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Antimony	<14,000	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Arsenic	17,040	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Arsenic	8,390	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Anthracene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Anthracene	290	J

AKH000603

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 86403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Pyrene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Pyrene	170	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(b)Fluoranthene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(b)Fluoranthene	450	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(g,h,i)Perylene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(g,h,i)Perylene	180	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Beryllium	<957	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Beryllium	<1,160	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Cadmium	1,350	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Cadmium	<1,160	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Chromium	10,800	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Chromium	9,060	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Chrysene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Chrysene	240	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Copper	36,500	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Copper	47,800	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Cyanide	420	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Cyanide	<130	

AKH000604

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Di-n-Butylphthalate	510	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Di-n-Butylphthalate	1,300	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Ethylbenzene	39	E
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Ethylbenzene	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Fluoranthene	48	E
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Fluoranthene	530	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Lead	59,900	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Lead	86,800	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Mercury	212	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Mercury	166	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Nickel	6,640	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Nickel	7,300	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	PCBs	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	PCBs	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Pesticides	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Pesticides	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Petroleum Hydrocarbons	5,080,000	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Petroleum Hydrocarbons	3,780,000	

AKH000605

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Phenols	170	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Phenols	<130	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Pyrene	44	E
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Pyrene	270	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Selenium	<957	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Selenium	<1,160	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Silver	<1,910	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Silver	<2,330	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Thallium	<1,910	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Thallium	<2,330	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Toluene	63	C
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Toluene	16	E
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Total AE	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Total AE	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Total BN	516	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Total BN	3,140	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Total VOC	63	
288E-MW01-02	MW03	HSAB	1.5-2.5	Soil	Total VOC	ND	

AKH000606

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Zinc	116,000	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Zinc	81,800	
288E-MW06	MW06	Well	NA	Water	Acenaphthene	0.9	E
288E-MW106	MW06	Well	NA	Water	Acenaphthene	0.8	E
288E-MW06	MW06	Well	NA	Water	Antimony	<60	
288E-MW106	MW06	Well	NA	Water	Antimony	<60	
288E-MW06	MW06	Well	NA	Water	Arsenic	16	
288E-MW106	MW06	Well	NA	Water	Arsenic	11	
288E-MW06	MW06	Well	NA	Water	Beryllium	<5.0	
288E-MW106	MW06	Well	NA	Water	Beryllium	<5.0	
288E-MW06	MW06	Well	NA	Water	bis(2-Ethylhexyl)Phthalate	7	
288E-MW106	MW06	Well	NA	Water	bis(2-Ethylhexyl)Phthalate	6	
288E-MW06	MW06	Well	NA	Water	Cadmium	11	
288E-MW106	MW06	Well	NA	Water	Cadmium	7.5	
288E-MW06	MW06	Well	NA	Water	Chloride	55,000	
288E-MW106	MW06	Well	NA	Water	Chloride	50,000	
288E-MW06	MW06	Well	NA	Water	Chromium	13	
288E-MW106	MW06	Well	NA	Water	Chromium	14	

AKH000607

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06	MW06	Well	NA	Water	Copper	167	
288E-MW106	MW06	Well	NA	Water	Copper	119	
288E-MW06	MW06	Well	NA	Water	Cyanide	27	
288E-MW106	MW06	Well	NA	Water	Cyanide	24	
288E-MW06	MW06	Well	NA	Water	Fluoranthene	2	E
288E-MW106	MW06	Well	NA	Water	Fluoranthene	1	E
288E-MW06	MW06	Well	NA	Water	Iron	75,000	
288E-MW106	MW06	Well	NA	Water	Iron	486,000	
288E-MW06	MW06	Well	NA	Water	Lead	521	
288E-MW106	MW06	Well	NA	Water	Lead	354	
288E-MW06	MW06	Well	NA	Water	Mercury	<0.2	
288E-MW106	MW06	Well	NA	Water	Mercury	1.2	
288E-MW06	MW06	Well	NA	Water	Nickel	<20	
288E-MW106	MW06	Well	NA	Water	Nickel	<20	
288E-MW06	MW06	Well	NA	Water	PCBs	ND	
288E-MW106	MW06	Well	NA	Water	PCBs	ND	
288E-MW06	MW06	Well	NA	Water	Pesticides	ND	
288E-MW106	MW06	Well	NA	Water	Pesticides	ND	

AKH000608

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06	MW06	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW106	MW06	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW06	MW06	Well	NA	Water	Phenanthrene	4	E
288E-MW106	MW06	Well	NA	Water	Phenanthrene	3	E
288E-MW06	MW06	Well	NA	Water	Phenols	18	
288E-MW106	MW06	Well	NA	Water	Phenols	20	
288E-MW06	MW06	Well	NA	Water	Pyrene	1	E
288E-MW106	MW06	Well	NA	Water	Pyrene	0.7	E
288E-MW06	MW06	Well	NA	Water	Selenium	<5.0	
288E-MW106	MW06	Well	NA	Water	Selenium	5	
288E-MW06	MW06	Well	NA	Water	Silver	<10	
288E-MW106	MW06	Well	NA	Water	Silver	<10	
288E-MW06	MW06	Well	NA	Water	Thallium	<10	
288E-MW106	MW06	Well	NA	Water	Thallium	<10	
288E-MW06	MW06	Well	NA	Water	Toluene	2	E
288E-MW106	MW06	Well	NA	Water	Toluene	28	
288E-MW06	MW06	Well	NA	Water	Total BN	7	
288E-MW106	MW06	Well	NA	Water	Total BN	6	

AKH000609

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06	MW06	Well	NA	Water	Total VOC	ND	
288E-MW106	MW06	Well	NA	Water	Total VOC	28	
288E-MW06	MW06	Well	NA	Water	Zinc	562	
288E-MW106	MW06	Well	NA	Water	Zinc	388	
288E-MW09	MW09	Well	NA	Water	Chloride	45,000	
288E-MW109	MW09	Well	NA	Water	Chloride	45,000	
288E-MW09	MW09	Well	NA	Water	Di-isopropyl ether	7	U
288E-MW109	MW09	Well	NA	Water	Di-isopropyl ether	7	U
288E-MW09	MW09	Well	NA	Water	Methanol	10	U
288E-MW109	MW09	Well	NA	Water	Methanol	10	U
288E-MW09	MW09	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW109	MW09	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW09	MW09	Well	NA	Water	Tert-butyl alcohol	7	U
288E-MW109	MW09	Well	NA	Water	Tert-butyl alcohol	7	U
288E-MW09	MW09	Well	NA	Water	Tert-butyl ether	7	U
288E-MW109	MW09	Well	NA	Water	Tert-butyl ether	7	U
288E-MW09	MW09	Well	NA	Water	Toluene	2	E
288E-MW109	MW09	Well	NA	Water	Toluene	--	
288E-MW09	MW09	Well	NA	Water	Total VOC	ND	
288E-MW109	MW09	Well	NA	Water	Total VOC	--	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

AKH000610

15

CENTRAL FILE

Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan for the Spencer Kellogg Facility Formerly a Division of Textron Inc. 400 Doremus Avenue Newark, Essex County, New Jersey

Volume I of V

ECRA Case No. 85403

June 1988

Prepared for:

Textron Inc.
Providence, Rhode Island 02903

Prepared by:

ENVIRON Corporation
210 Carnegie Center, Suite 201
Princeton, New Jersey 08540

AKH000611

945990415

LIST OF FIGURES

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

C O N T E N T S

C O N T E N T S (continued)

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

LIST OF FIGURES

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

LIST OF APPENDICES

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

LIST OF PLATES
(Appendix I)

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

EXECUTIVE SUMMARY

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA), which allowed Textron to sell its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg Facility) to NL Industries, Inc. As part of the ECRA process, ENVIRON received the New Jersey Department of Environmental Protection's (NJDEP) approval of a Phase I Sampling Plan for the Spencer Kellogg facility and implemented that plan from November 1986 to March 1987. ENVIRON submitted the results of the Phase I Sampling Plan to NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and reported the results to NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

The findings from the Phase I and Interim Investigation studies indicated that several classes of constituents were present in soil and ground water at the Spencer Kellogg facility. However, the data were insufficient to define fully the nature and extent of the constituents' presence in all areas of the site and to characterize completely the ground water flow patterns. In order to obtain additional critical data, ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987.

The specific objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) further define the direction of ground water flow in both the shallow and deep aquifers; (3) define the nature and pattern of metal contamination in both soils and ground water; (4) identify the oils that contribute to the observed hydrocarbon contamination in each area of environmental concern (AEC); and (5) determine the location of the discharge point(s) for the floor drains in Building 26.

The hydrogeologic results of the Phase II Sampling Plan were generally consistent with the data obtained during the previous site investigations. Shallow ground water flow is largely influenced by the presence of the underground flume, which acts as a discharge point during both low and high tides. Additionally, the data obtained from one newly installed monitoring well located along the easternmost portion of the on-site storm sewer system indicate that either the backfill of the storm sewer or the point of penetration of the storm sewer conduit through the breakwall along Newark Bay may be acting as a local area sink for shallow ground water during low tide. Ground water flow within the deeper aquifer appears to be towards Newark Bay during low tide and away from the bay during high tide. The effects of high tide appear to be most pronounced in the eastern portion of the site.

Analytical results of forty-two (42) soil samples collected from the shallow fill unit indicate the presence of priority pollutant metals and petroleum hydrocarbons at concentrations in excess of informal ECRA cleanup guidelines. Lead, zinc, copper, and mercury are the most common metals, particularly in the central and eastern areas of the site. The variability of metal concentrations in soil samples taken near the surface and the increase of metal concentrations with depth at some sampling locations suggest that the presence of priority pollutant metals was most likely caused by the fill material. This conclusion is supported by site history, as none of the priority pollutant metals is known to have been used at the Spencer Kellogg facility.

Hydrocarbon "fingerprinting" analyses, designed to determine the relative amounts of petroleum versus non-petroleum-based hydrocarbons, indicate that a significant portion of what were originally described as petroleum-based hydrocarbons are non-hazardous fish and vegetable oils. The "fingerprinted" petroleum-based hydrocarbons include fuel oils, lubricating oils, gasoline, paint thinner, and coal tar. In certain areas of the site these petroleum-based hydrocarbons are present in concentrations exceeding the informal ECRA cleanup guideline. These petroleum-based hydrocarbons could have resulted from either the use of contaminated fill material or on-site manufacturing activities.

Results of the shallow ground water analyses do not indicate the presence of dissolved metals which can be related to on-site activities and operations. Selenium was detected in the shallow aquifer at levels in excess of the informal ECRA cleanup guideline. Similar levels of selenium were reported for the sample collected from Newark Bay. Given the extent of tidal impact on the site's ground water, the bay is probably the source of selenium on the site. During implementation of the Phase II sampling plan, additional metals, including lead, cadmium, chromium and/or mercury, copper, arsenic and zinc were detected at levels above the informal ECRA cleanup guidelines. The results of filtered ground water samples collected during the March 1988 sampling round, however, indicate that these metals are associated with fine particulate sediment and were detected in the laboratory due to field acidification of unfiltered samples. The metals associated with the fine particulate sediment are likely to be related to the fill material.

Petroleum hydrocarbons in excess of informal ECRA cleanup guidelines were detected in two designated background wells monitoring the shallow fill unit. These data, combined with the absence of petroleum hydrocarbons in other site monitoring wells, indicate that the presence of petroleum hydrocarbons in the shallow ground water is the result of migration from an off-site source.

Volatile organics were also detected at levels above informal ECRA cleanup guidelines in two shallow monitoring wells. Results of the March 1988 sampling confirmed the existence of volatile organics in these wells and indicated relatively low levels of these constituents in two additional shallow wells. These data suggest, however, that the extent of volatile organics in the shallow ground water is limited to relatively small areas of the site.

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Analytical results of ground water samples collected from wells monitoring the deep aquifer do not indicate the presence of contaminants related to on-site activities. When sampled as part of the Phase II Sampling Plan, two wells (MW22 and MW26), located in the easternmost portion of the site, adjacent to Newark Bay, contained levels of petroleum hydrocarbons (MW26) or lead (MW22) slightly above the informal ECRA cleanup guidelines. However, neither well contained petroleum hydrocarbons or lead when resampled as part of the March 1988 sampling nor was lead found in MW22 during the first phase of sampling. Therefore, a pattern of contamination has not been observed. The well that contained lead also evidenced selenium contamination during the March 1988 sampling when similar levels of selenium were found in a sample collected from Newark Bay, suggesting that this contamination was related to the tidal impact of Newark Bay on this particular monitoring well.

Dye tests were performed on the floor drains inside Building 26 to determine their point of discharge. The results indicate that the drainage pipe may lack physical integrity.

The nature, patterns, extent and likely sources of contamination at the Spencer Kellogg facility have largely been determined and/or confirmed during the execution of the Phase II Sampling Plan.

In accordance with the requirements of ECRA, remedial strategies have been defined and are included as part of this document. Set forth, too, are evaluative criteria used to determine the need for and potential scope of remediation. These are consistent with the goal of protecting public health and the environment and take into consideration other relevant factors such as the source of contamination, location of the industrial establishment and surrounding ambient conditions. Although the need for remediation at the site appears to be minimal, this document proposes the implementation of a feasibility study for in-situ treatment of volatile organics in on-site soils.

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

I. INTRODUCTION

A. Purpose

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA) which allowed Textron to sell its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg facility or the site) to NL Industries, Inc. *In order to assist Textron in complying with ECRA*, ENVIRON received the New Jersey Department of Environmental Protection's (NJDEP) approval of a Phase I Sampling Plan and implemented that plan from November 1986 to March 1987. ENVIRON submitted the results to the NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and presented the results to the NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

Results of the Phase I Sampling Plan indicated the presence of soil and ground water contamination[1] at the Spencer Kellogg facility. ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987 to define fully the nature and areal extent of

---

1 For this report, "contamination" is defined as concentrations of a particular substance exceeding informal NJDEP-established ECRA cleanup guidelines for soil or ground water (Appendix A). ENVIRON is using these guidelines to simplify the presentation and interpretation of sampling results. Neither ENVIRON nor Textron suggests, however, that the informal ECRA cleanup guidelines provide an appropriate basis for determining the need for and/or scope of site cleanup.

both soil and ground water contamination in certain areas of the site, to characterize ground water flow patterns, and to clarify other issues that were not resolved during the first phase of sampling.

In this report, ENVIRON provides a summary of background information and previous analytical results, presents the results of the Phase II Sampling Plan and additional sampling program conducted in March 1988, and sets forth a remediation strategy. The discussion of the Phase II Sampling Plan and the March 1988 sampling program includes the methodologies used to collect soil and ground water samples, presents the site-specific geologic, hydrogeologic and analytical results, and interprets these results in terms of ECRA requirements. The remediation strategy includes a discussion of the criteria used in evaluating cleanup requirements and a feasibility study for in situ treatment of on-site soils.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site, approximately 10 acres in size, is directly across from Kearny Point -- which marks the confluence of the Passaic and Hackensack Rivers, which join to form Newark Bay. Originally marshland, the site was filled in by the early 1900's and has since been subject to industrial activity.

Plate 1 (Appendix I) depicts the main features of the site. A breakwall consisting of concrete-covered rip rap is located along the eastern property edge adjacent to Newark Bay. West of the property is a landfill which drains into Plum Creek. Upon leaving the landfill, Plum Creek enters an underground conduit or flume, through which it flows under Doremus Avenue and beneath the site. This flume discharges from a pipe in the breakwall directly into Newark Bay.

According to plant personnel. the site has been used as a manufacturing facility since the first or second decade of this century. Before this, the site formerly housed an alcohol distillery. Resins and resin-related products have been manufactured on-site from the early 1930s to the present. For the past several decades, the facility manufactured coating resins used primarily in the paint industry. The site has been almost entirely paved for the last few decades.

C. Summary of Phase I Sampling Plan Results

Based on a series of initial site visits and a review of past and present operations, twenty-seven (27) areas of environmental concern (AECs) were identified. The rationale for selection of each AEC is provided in Table I-1, and the locations are illustrated on Plate 1 (Appendix I). To evaluate the effect of past site activities on the quality of soil and ground water and to determine the geologic and hydrogeologic characteristics of the site, ENVIRON completed forty-six (46) soil borings, and installed eleven (11) shallow monitoring wells and three (3) deep monitoring wells during execution of the Phase I Sampling Plan, primarily within the aforementioned AECs. Soil, surface water and ground water samples were collected and analyzed for those chemicals that may be present due to industrial activities within the AECs.

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Table I-1: Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of possible discharge onto unpaved region from dumpster and compactor which receive waste from Buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of possible discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of possible discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of potential contamination beneath building on stilts possibly caused by a discharge of raw materials and finished products from the polyester resin manufacturing process through a hole in the building's floor.

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1 (Appendix I). The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Table I-1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale for Selection
10	Current raw materials storage area. Before area was paved, area was used for finished product and raw materials storage.
11	Former aboveground storage tank located in unpaved area.
12	Building on stilts with potential for spills or discharges beneath.
13	Site of former aboveground storage tanks while area was unpaved.
14	Site of former aboveground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with evidence of spills.

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1 (Appendix I). The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

Table I-1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former aboveground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix (a hazardous waste) has been stored in drums.
23	Tank wagon loading area for Building 4 where 1285 Premix may be generated.
25	Tank wagon loading area for Building 26 where 1285 Premix may be generated.
26	Drains in large tank farm which may have discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, DEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, DEP site inspection).

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1 (Appendix I). The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

The Phase I Sampling Plan results indicate that the primary soil contaminants at the site are total petroleum hydrocarbons (TPHCs) and volatile organic compounds (VOCs), specifically ethylbenzene and toluene. Base neutral organic compounds (BNs), priority pollutant metals (PPMs), and other VOCs, such as benzene, methylene chloride and chloroform, were detected in only a few soil samples. Soil contamination was limited to the shallow fill unit.

The primary ground water contaminants detected at the site were ethylbenzene and toluene. PPMs were detected above informal ECRA cleanup guidelines in two of five wells tested. TPHCs, benzene, and cyanide were each detected in only one ground water sample.

No other pollutants of concern were detected at concentrations above informal ECRA cleanup guidelines in soil or ground water samples collected during Phase I sampling. The informal ECRA cleanup guidelines for soil and ground water are provided in Appendix A. The pattern of contamination for each of these parameters is summarized below.

1. Total Petroleum Hydrocarbons (TPHCs)

All soil and ground water samples collected as part of the Phase I sampling program were analyzed for TPHCs. Only the ground water sample obtained from MW2 contained levels of TPHCs (70 ppm) in excess of the informal ECRA cleanup guideline. This contamination appears to be from an off-site source, because MW2 is a background well located upgradient of any possible source(s) of TPHC contamination associated with activities at the site. No industrial activity or handling of hazardous materials is reported to have occurred in the vicinity of MW2. Potential TPHC sources include a municipal landfill and several industrial facilities located off-site in the general area of the facility.

Fifty-three of the sixty-three Phase I soil samples contained concentrations of TPHCs exceeding the informal ECRA cleanup guideline. However, the standard TPHC analytical method used in the Phase I analysis detects both petroleum and non-petroleum-based hydrocarbons. Many of the hydrocarbon compounds which have been used at the Spencer Kellogg facility are not petroleum-based hydrocarbons, but would be detected and quantified as TPHCs by this standard method. These non-petroleum compounds include fish oil, linseed oil, castor oil, sunflower fatty acid, and soybean oil.

2. Priority Pollutant Metals (PPMs)

Phase I soil samples were analyzed for PPMs at five designated background locations -- MW1, MW6, MW9, MW21 and MW23. Arsenic and mercury were each found in concentrations exceeding informal ECRA cleanup guidelines at only one sampling location. Copper, lead, and zinc were found at levels exceeding informal ECRA cleanup guidelines at two or more locations.

The arsenic contamination was detected in the samples collected from MW23. In the soil samples collected from MW1, however, which is located within a few feet of MW23, arsenic was detected at concentrations below the informal ECRA cleanup guideline. These results suggest that the presence of arsenic may be indicative of the heterogeneous fill material.

Mercury contamination was found in one of two soil samples collected from MW9. In the sample collected from 0 to 2 feet, 66 ppm of mercury was detected. In the sample collected immediately below this, from a depth of 2 to 4 feet, a concentration of 5,600 ppm was detected. The difference in concentrations and the increase along the vertical soil profile suggest that the source of the mercury is the fill material rather than surficial industrial activities at the site.

Copper, lead and zinc contamination was detected in the soil samples collected from MW6 and MW9. Like the mercury contamination described above, the concentrations of each of these metals increased with depth at each location. High concentrations of copper and lead were also found in the soil sample collected from MW21. Again, because of the increasing concentrations of these metals with depth, it is likely that the presence of these constituents is related to the fill material, rather than to surficial industrial activities at the site.

Ground water samples from two of the shallow wells were analyzed for PPMs. MW6 was analyzed for all of the PPMs, while MW9 was analyzed only for lead. Lead was found in concentrations exceeding the informal ECRA cleanup guideline in samples from both of these wells.

3. Volatile Organic Chemicals (VOCs)

All ground water samples and nearly all soil samples collected during the Phase I field program were analyzed for VOCs. In general, VOC contamination in ground water was found to be limited both in areal extent and in the number of compounds detected.

Ethylbenzene and toluene are the primary volatile contaminants detected in both soil and ground water at the site. Benzene, methylene chloride, and chloroform were found in a few soil samples where either ethylbenzene or toluene was present. Benzene was also found in one ground water sample that also contained both ethylbenzene and toluene.

Soil samples from 13 of the 22 tested AECs were found to contain total VOCs exceeding the informal ECRA cleanup guideline. The railroad car loading and unloading areas (AECs 3 and 4, respectively) are contaminated with ethylbenzene and, usually to a lesser extent, toluene. AEC 7, the site of tank unloading of solvents prior to and subsequent to the area being paved, is contaminated with ethylbenzene. The area under Building 4 (AEC 12) is contaminated with ethylbenzene and generally lower concentrations of toluene. AEC 15, a drum storage area while the site was unpaved, contains elevated levels of volatile organics, primarily toluene. The locations of some former aboveground storage tanks and drum storage areas (AECs 14, 16, part of AEC 17, and AEC 19) are contaminated with ethylbenzene and toluene. AEC 21, a former aboveground tank farm, is contaminated with ethylbenzene and, to a lesser extent, toluene. Soils impacted by resins from a hole in Building 16 (AEC 9) are contaminated with toluene only. AEC 23, a tank wagon loading area for Building 4 was slightly contaminated with ethylbenzene. AEC 25, a loading and unloading area for waste resin solutions, was contaminated primarily with toluene.

Volatile organics in the shallow ground water were found at levels exceeding informal ECRA cleanup guidelines in 4 of 11 Phase I monitoring wells (MW6, MW7, MW10, MW11). The highest concentrations were detected in MW10 (34 ppm; total VOC).

Phase I deep aquifer ground water samples contained levels of VOCs below informal ECRA cleanup guidelines, with the exception of MW22 (216 ppb; total VOC). This VOC contamination was originally thought to be the result of some hydrologic relationship with the underground flume created by an imperfect seal above the well screen because the concentration of VOCs detected in MW22 was similar to that detected in the flume. Additionally, no VOCs were detected in the soil sample collected immediately above the deep aquifer at this location. Results of field work associated with the Interim Investigation indicated, however, that the seal of MW22 had physical integrity. Therefore, the source of VOCs detected in this well must be something other than the water within the flume.

4. Other Contaminants

Ground water samples from MW6, MW10, MW11, MW21 and MW23 and soil samples from AEC 6, AEC 8, MW1, MW6, MW9, MW10, MW21, and MW23 were analyzed for base neutral compounds (BNs) or polycyclic aromatic hydrocarbons (PAHs). No ground water samples contained BNs in concentrations greater than the informal ECRA cleanup guidelines. BNs were detected above informal ECRA cleanup guidelines in only one of four soil samples from AEC 8; one of two soil samples each from MW6 and MW10; both soil samples from MW9 and MW10; and one of three soil samples from MW23. The source of contamination in AEC 8 appears to be half-buried fuel oil tanks. Contaminants in MW9 may be associated with the former use of a nearby underground gasoline storage tank (AEC 20). The source of BN contamination in MW6 is unknown. The contamination found in the soil sample from MW10 may be the result of leaking drums which were previously stored in this area while it was unpaved. ENVIRON believes that the BNs found in MW23 may be from an off-site source, because MW23 is a background well located upgradient of any possible sources of contamination originating from the former Textron facility. Additionally, this well is located at the western boundary where the aquifers flow onto the property. Other potential sources of BN contamination are located off-site, including several industrial facilities.

During Phase I, ground water samples from MW6, MW21 and MW23 were tested for cyanide; however, it was not detected at levels above the informal ECRA cleanup guidelines. Soil samples from locations MW1, MW9, MW21 and MW23 were also tested for cyanide, but again it was not detected at concentrations above the informal ECRA cleanup guidelines.

D. Scope of Work for Phase II Sampling Plan

As previously stated, analytical results of the Phase I Sampling Plan indicate some on-site contamination of both soil and ground water. The Phase II Sampling Plan was developed to close the data gaps from the Phase I field investigation and to provide a more comprehensive data base required for determining the nature and extent of soil and ground water remediation. The specific objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) characterize further the ground water flow in both the shallow and the deep aquifers; (3) identify the oils that contribute to the TPHC contamination in each AEC; (4) define further the nature and pattern of metal contamination; and (5) determine the location of the discharge point(s) for the floor drains in Building 26. The scope of work and the approaches utilized to meet the objectives of the Phase II Sampling Plan are described below.

1. Further Characterization of Site Hydrogeology

ENVIRON installed 11 additional shallow and deep monitoring wells (Plate 1; Appendix I) to characterize further ground water quality and flow direction in both the shallow and deep aquifers. Some of the wells were installed downgradient of the most significant sources of known soil and ground water contamination to examine the impact, if any, of contaminated soils on the shallow ground water and to determine the extent, if any, of ground water contaminant migration. More specifically, the eight shallow monitoring wells were installed during Phase II to investigate further the shallow ground water flow direction in the central and eastern portions of the site and the nature and effects, if any, of the on-site storm sewer system on shallow ground water flow. Three deep monitoring wells were installed to enhance our understanding of ground water quality and flow in the deep aquifer. All of the Phase II wells were also used to evaluate the fate and transport of VOCs previously detected in the ground water and to examine the nature and pattern of PPM contamination.

2. Total Petroleum Hydrocarbons

In an effort to identify and quantify the concentrations of petroleum and non-petroleum-based hydrocarbons, ENVIRON had select surficial soil samples "fingerprinted" as part of the Phase II sampling program. The fingerprinted soil samples were collected from those AECs believed to contain significant concentrations of non-petroleum-based hydrocarbons. The samples were analyzed by Erco Laboratory, a division of Enseco Inc., using the "gasoline and oil fingerprinting" method, modified from the U.S. Coast Guard Oil Spill Identification System (Method CG-D-52-77). This method enabled the quantification of each type of oil, whether non-petroleum or petroleum.

3. Metals and Cyanide

The Phase I sampling results were insufficient to determine the pattern and extent of metal and cyanide contamination in the soil and/or ground water. All Phase II soil and ground water samples, with the exception of one surface grab sample, were analyzed for metals to evaluate further the nature and extent of potential metal contamination. The sampling protocol and schedule were designed to obtain site-wide data to determine whether metal contamination is related to previous site activities. All ground water samples collected during Phase II were analyzed for the presence of cyanide.

4. Determine Discharge Point(s) for Building 26 Floor Drains

Two dye tests were conducted during the implementation of the Phase I Sampling Plan to determine the discharge point(s) of the floor drains in Building 26. These two tests were unable to identify the discharge point. ENVIRON therefore arranged for a subcontractor to conduct additional tests to determine the outfall(s) of floor drains in Building 26.

E. Subsequent Modifications to the Phase II Sampling Plan

As part of the original Phase II Sampling Plan, ENVIRON proposed to conduct a soil gas survey to obtain the data necessary to determine the feasibility of using vacuum gas extraction (VGE) for the remediation of soil contaminated with VOCs. After submitting the Phase II Sampling Plan to NJDEP, ENVIRON held several meetings with potential subcontractors to discuss the range of technical options for site remediation. As a result of these discussions, ENVIRON submitted a November 4, 1987, letter to Ms. Christine Hylemon of NJDEP proposing to postpone the soil gas survey. NJDEP verbally approved this proposal in November 1987 and subsequently confirmed it with a January 5, 1988, letter to Mr. Paul Duff of Textron. The resulting changes to the Phase II Sampling Plan included: 1) the deletion of all soil VOC+15 analyses; 2) the deletion of all soil probe (OVA) analyses; and 3) the deletion of all physical parameter analyses which would have been required to determine the feasibility of a VGE remedial system.

II. METHODOLOGY

A. Soil Borings

1. Drilling Methods

Most of the Phase II soil borings were drilled using a hollow stem auger. Where access to a sampling location by a drill rig was limited, such as inside a diked wall or under a railroad tanker car, a hand auger or trowel was used for sample collection. All soil borings were plugged with a cement-bentonite grout mixture following sample collection. The drilling and plugging methods used for each boring are described on the boring logs attached to this report as Appendix B. The boring logs also include the geologic log, the drilling specifications and descriptions of the collection depth and chemical analyses performed on each sample.

2. Sample Collection Methods

Soil samples were generally collected from each soil boring utilizing a split spoon sampling device. The proposed sampling depths included the first six-inch interval below the ground surface or asphalt and the six-inch interval immediately above the water table. Because of the high water table encountered at the site (usually between 2.5 and 3 feet below ground surface) and the presence of gravel below the asphalt at many boring locations, the surface sample was often within one foot of the water table. Thus, only one sample was collected at many locations. Additionally, poor split spoon recovery at some sampling locations made it difficult to determine the actual depth of the sample. In these instances, the sampling depth was recorded as the maximum depth range of the split spoon.

B. Monitoring Wells

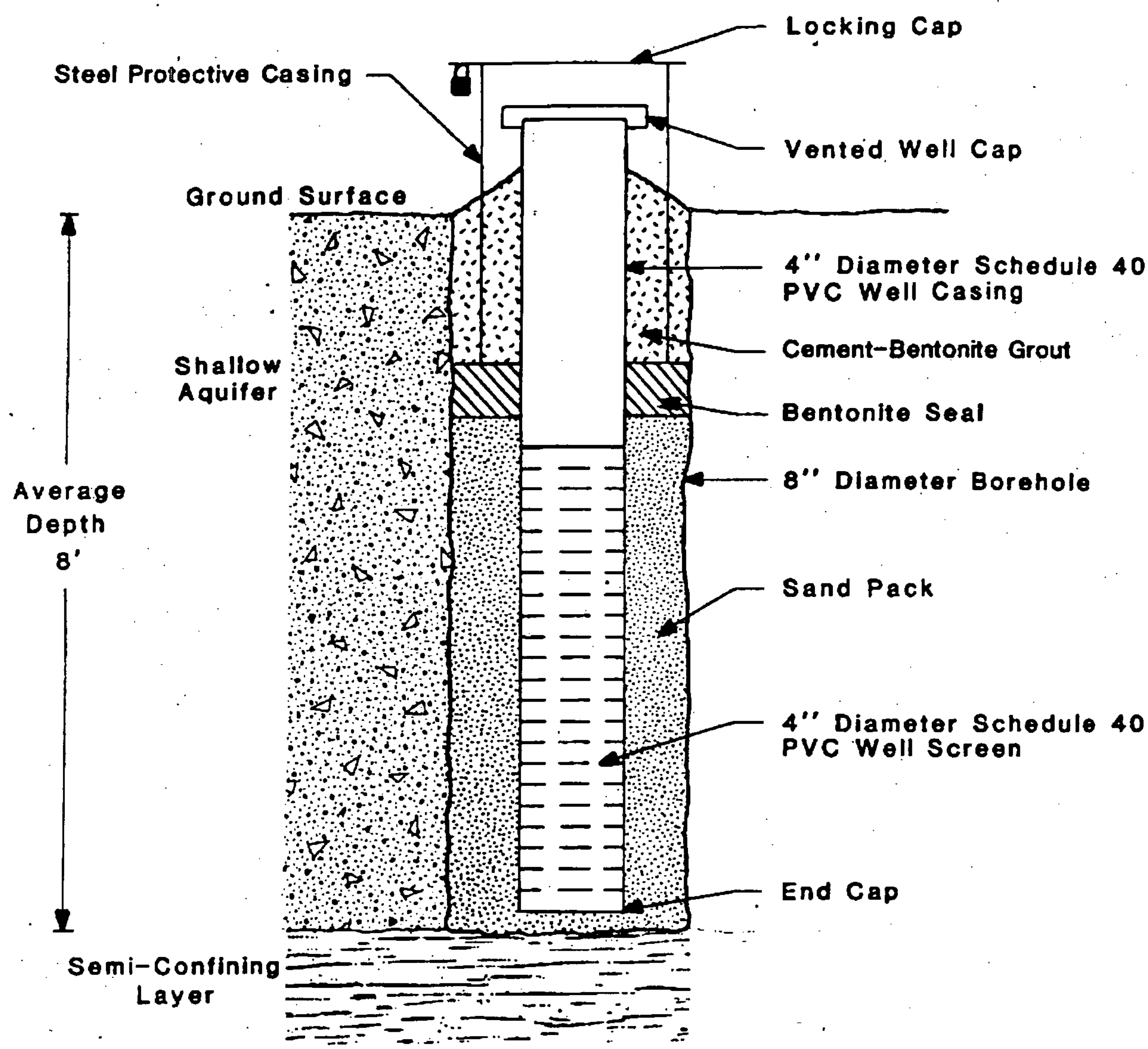
1. Shallow Well Construction

In general, the borehole for each shallow well was drilled with a hollow stem auger rig through the water-bearing fill zone to the top of the semi-confining clay, silt and peat unit. The total depth of these wells typically ranged from 6 to 10 feet below grade. The wells were screened from the bottom of the fill unit to a depth equivalent to or just slightly above the water table. The typical construction of the shallow wells is illustrated in Figure II-1.

Detailed technical information concerning each of the shallow monitoring wells is provided in Appendix C. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for all wells are summarized in Appendix D.

2. Deep Well Construction

The three deep wells were completed as telescoped wells to prevent the potential downward migration of contaminants from the shallow soils and/or ground water during drilling operations. The



AKH000645

ENVIRON Counsel in Health and Environmental Science	SPECIFICATIONS FOR SHALLOW MONITORING WELLS	Figure II - 1

137003

boreholes were initially advanced using a hollow stem auger to a minimum of three feet into the semi-confining clay, silt and peat unit. Protective steel surface casings were then installed and the annular space of the boreholes filled with a cement-bentonite grout mixture. Tremie-grouting techniques were used to seal the boreholes. Approximately two feet of grout was then emplaced inside the protective steel surface casings to assure a proper seal. The grout was allowed to harden for 24 hours.

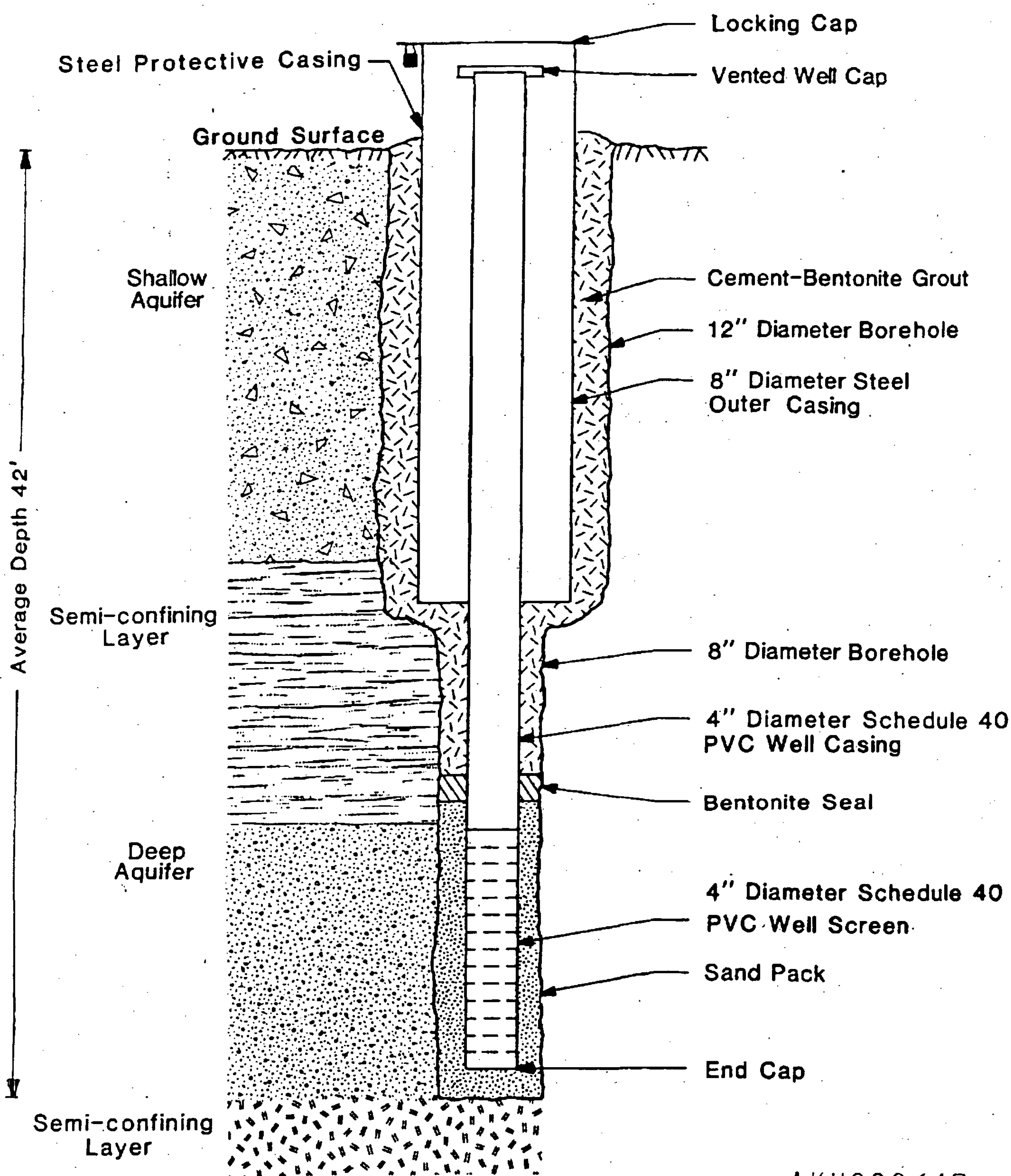
The boreholes were subsequently advanced through the outer protective surface casing using mud rotary drilling techniques until the confining layer beneath the lower aquifer was encountered, typically at depths between 40 and 45 feet below grade. The PVC well was then installed and the entire lower aquifer screened. The typical construction of the deep wells is illustrated in Figure II-2.

Detailed technical information concerning each of the deep monitoring wells is provided in Appendix C. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for all wells are summarized in Appendix D.

3. Well Completion

All Phase II monitoring wells were completed approximately two feet above grade. Protective steel casings with locking caps were placed over all newly-installed monitoring wells. The inner casings were covered with vented caps.

AKH000646



AKH000647

ENVIRON
Counsel in Health and Environmental Science

SPECIFICATIONS FOR DEEP MONITORING WELLS

Figure II-2

4. Well Development

The shallow wells typically were pumped for a period of thirty minutes, and the deep wells for approximately one hour. All monitoring wells, however, were developed until the water appeared to be clear (devoid of fine sediment) or until it was apparent that the water would not become clearer.

5. Well Sampling Method

The monitoring wells were sampled by Century Laboratories, Inc., a state certified laboratory. In accordance with NJDEP requirements, a minimum of three well volumes of ground water were purged prior to sampling. All shallow and deep wells were purged with a centrifugal pump. During purging, temperature, pH and specific conductivity of the ground water were periodically measured. Ground water samples were collected only after these parameters had stabilized, or after the well had been pumped dry and allowed to recover. This ensured that the water was drawn from the aquifer, rather than from the stagnant zones around each well. The data collected while purging the wells is reported in Appendix E.

C. Quality Assurance/Quality Control Measures

1. Decontamination Procedures

Before the collection of every sample, all soil sampling equipment, including split spoons, hand augers and trowels, was decontaminated by steam cleaning with potable water. In addition, the augers and other downhole drilling equipment were steam cleaned between each borehole. To avoid cross-contamination between samples, fresh gloves were used to collect each sample. The teflon bailers, provided by Century Laboratories for ground water sampling, were decontaminated in the laboratory prior to sampling and used only once on-site.

2. Control Samples

Duplicate samples, wash blanks, and trip blanks were collected to provide quality control. Four duplicate soil samples were collected and analyzed for PPMs. Three duplicate ground water samples were collected and analyzed for TPHCs, VOCs, PPMs and cyanide. Five wash blanks were collected and analyzed for the same parameters scheduled to be tested in the samples collected during the day each wash blank was prepared. In addition, a total of three trip blanks were prepared by the laboratory and analyzed for VOCs plus a forward library search (VOC+15). Contaminants above informal ECRA cleanup guidelines were not detected in any Phase II wash blanks or trip blanks. Results of the duplicate analyses are provided in Section IV.

D. Subcontractors

1. Analytical Laboratories

All ground water and soil samples collected at this site were analyzed by Century Laboratories, Inc. (Century) of Thorofare, New Jersey (State Certification No. 08153). Under ENVIRON's direction, Century also collected the ground water samples from each of the monitoring wells.

The fingerprinting analyses of select soil samples were performed by Erco Laboratory (a division of Enseco, Inc.) of Cambridge, Massachusetts.

2. Surveyor

The location and elevation of each new monitoring well and boring were surveyed in December 1987 by James M. Stewart, Inc. of Philadelphia, Pennsylvania, a licensed surveyor. These location coordinates and ground surface elevations are provided in Appendix F.

3. Sewer Service Specialists

Central Jersey Environmental, Inc., a sewer servicing specialist of Hightstown, New Jersey, was retained to determine the discharge point of the floor drains in Building 26. Smoke and dye tests were performed on November 13, 1987, to determine the outfall of the Building 26 floor drains. The results of these are discussed in Section IV.

III. GEOLOGIC AND HYDROGEOLOGIC RESULTS

A. Hydrogeologic Setting

Examination of soil boring logs and monitoring well information from both Phase I and Phase II sampling indicates that four distinct stratigraphic zones underlie the site to a depth of approximately 40 feet below the ground surface. Zone 1 consists of fill material and is characterized by sandy soils, brick fragments, glass and cinders. The fill has an average thickness of 8 feet, but varies in thickness from 2 to 11 feet across the site. Zone 2 lies beneath the fill material and consists of a clay, silt and peat unit with an average thickness of 19 feet. Zone 3 is a well-sorted sand and gravel unit, which varies in thickness from 12 to 14 feet. Beneath this sand and gravel is Zone 4, a reddish-brown clay and silt unit of unknown thickness.

The fill material of Zone 1 and the well-sorted sand and gravel of Zone 3 constitute the two water-bearing units beneath the site. Ground water elevations collected from wells monitoring the fill unit range from 2 to 4 feet below the ground surface, while ground water in the wells monitoring the deeper transmissive zone was typically encountered at a depth of 4 feet below grade. This suggests a potential downward gradient from the upper zone to the lower transmissive unit. Ground water levels may vary, however, with seasonal changes and precipitation.

B. Ground Water Flow Regime

From Phase I water level measurements, ENVIRON inferred the general direction of shallow ground water flow to be towards an underground flume that travels beneath the site and discharges into Newark Bay. The direction of ground water flow within the deeper aquifer was observed to be west to east towards Newark Bay. Additional investigation determined that both aquifers and the flume are tidally influenced. Tidal influence in the shallow aquifer extends approximately 130 feet from Newark Bay. The distance of tidal influence laterally from the flume is approximately 50 feet, provided no other obstructions are present, such as building foundations. The full extent of tidal influence in the deeper aquifer is unknown.

The results of the Phase I Sampling Plan also suggested that shallow ground water flow towards Newark Bay may be impaired by the breakwall located on the eastern border of the site and penetrated by both the underground flume and a storm sewer conduit. These points of penetration through the breakwall possibly act as discharge points for the shallow aquifer. Additionally, the storm sewer system, or its surrounding backfill, may be acting as a sink for the shallow aquifer and may play a major role in determining ground water flow patterns.

ENVIRON installed 11 additional monitoring wells and collected monthly ground water level measurements as part of the Phase II Sampling Plan in order to examine further (1) the direction of shallow ground water flow, particularly in the central and eastern portions of the site; (2) the effects of the on-site storm sewer system on ground water flow within the shallow aquifer; and (3) the general direction of ground water flow in the deep aquifer.

Ground water level measurements have been collected monthly during both low and high tides since January 1988. Top of casing elevations, depth to ground water measurements, and resultant ground water elevations relative to mean sea level are presented in Table III-1. Typical ground water contour maps illustrating the direction of ground water flow within the shallow fill unit at both low and high tides are provided in Figures III-1 through III-7. Generalized ground water elevation maps for the deep aquifer at both low and high tides are provided in Figures III-8 through III-12.

Results of the monthly ground water measurements confirm that the typical direction of shallow ground water flow during both low and high tides at the site is towards the underground flume. The most pronounced effect of the flume on shallow ground water flow, however, occurs during low tide. The steepest hydraulic gradients were observed during this tidal cycle, and it was determined during earlier site investigations that the flume is tidally influenced.

Monitoring wells 16 and 17 were installed during the execution of the Phase II Sampling Plan to monitor the influence, if any, of the on-site storm sewer system on shallow ground water flow. Results of recent ground water measurements indicate that the area in the vicinity of MW17 is acting as a local area sink during low tide (Figure III-1).

pencer Kellogg Facility, Newark, New Jersey
CRA Case # 85403

able III-1: Water Level Measurements

ell umber	Top of Casing (ft./msl)	January 14, 1988 Mixed Tide Depth to Water (ft.)	January 14, 1988 Mixed Tide Elevation (ft/msl)	January 25, 1988 Low Tide Depth to Water (ft.)	January 25, 1988 Low Tide Elevation (ft/msl)	January 25, 1988 High Tide Depth to Water (ft.)	January 25, 1988 High Tide Elevation (ft/msl)	March 2, 1988 Low Tide Depth to Water (ft.)	March 2, 1988 Low Tide Elevation (ft/msl)
W-1	7.72	6.06	1.66	5.27	2.45	5.28	2.44	5.20	2.52
W-2	7.92	4.84	3.08	3.96	3.96	3.92	4.00	4.18	3.74
W-3	6.24	*	*	3.34	2.90	3.36	2.88	3.51	2.73
W-4	5.83	5.69	0.14	4.57	1.26	3.40	2.43	5.20	0.63
W-5	7.67	5.18	2.49	4.32	3.35	4.31	3.36	4.59	3.08
W-6	8.80	5.70	3.10	4.76	4.04	4.68	4.12	4.90	(4.90)
W-7	7.44	6.83	0.61	8.93	(1.49)	4.34	3.10	6.98	ERR
W-8	5.62	5.54	0.08	4.27	1.35	3.62	2.00	4.47	(4.47)
W-9	8.76	5.99	2.77	5.05	3.71	4.97	3.79	5.19	(5.19)
W-10	9.08	5.75	3.33	4.98	4.10	4.91	4.17	5.03	(5.03)
W-11	8.61	5.74	2.87	4.82	3.79	4.82	3.79	4.80	(4.80)
W-12	9.16	6.84	2.32	6.43	2.73	6.43	2.73	6.58	(6.58)
W-13	8.85	5.35	3.50	4.63	4.22	4.56	4.29	4.71	(4.71)
W-14	9.03	5.63	3.40	5.02	4.01	5.01	4.02	5.15	(5.15)
W-15	9.04	5.71	3.33	5.08	3.96	5.06	3.98	5.22	(5.22)
W-16	7.29	4.15	3.14	3.58	3.71	3.39	3.90	3.67	(3.67)
W-17	6.64	6.12	0.52	5.81	0.83	3.43	3.21	5.82	(5.82)
W-18	7.42	5.22	2.20	4.53	2.89	4.23	3.19	4.65	(4.65)
W-19	8.00	5.02	2.98	4.23	3.77	4.24	3.76	4.34	(4.34)
W-21	8.32	8.09	0.23	7.41	0.91	6.87	1.45	7.50	(7.50)
W-22	5.43	5.21	0.22	5.06	0.37	3.92	1.51	5.30	(5.30)
W-23	7.53	7.28	0.25	6.54	0.99	6.04	1.49	6.64	(6.64)
W-24	9.03	9.33	(0.30)	8.50	0.53	7.46	1.57	8.85	(8.85)
W-25	7.83	7.47	0.36	7.38	0.45	6.21	1.62	7.75	(7.75)
W-26	6.43	6.10	0.33	6.07	0.36	4.73	1.70	6.56	(6.56)

otes:
1. All ground water elevations are reported in feet above mean sea level, except values in parentheses, which are feet below mean sea level.

2. * = MW-3 could not be located on 01/14/88 due to heavy ice and snow on the ground surface.

AKH000655

pencer Kellogg Facility, Newark, New Jersey
:CRA Case # 85403

'able III-1: Water Level Measurements (continued)

Well Number	Top of Casing (ft./msl)	March 2, 1988 High Tide: Depth to Water (ft.)	March 2, 1988 High Tide: Elevation (ft/msl)	March 16, 1988 High Tide: Depth to Water (ft.)	March 16, 1988 High Tide: Elevation (ft/msl)	April 13, 1988 Low Tide: Depth to Low Water (ft.)	April 13, 1988 Low Tide: Groundwater (ft.)	April 29, 1988 Low Tide: Depth to Low Water (ft.)	April 29, 1988 Low Tide: Groundwater (ft.)
W-1	7.72	5.20	2.52	5.64	2.08	6.06	1.66	5.79	1.93
W-2	7.92	4.19	3.73	4.58	3.34	4.87	3.05	4.67	3.25
W-3	6.24	3.54	2.70	3.57	2.67	3.16	3.08	3.56	2.68
W-4	5.83	3.74	2.09	2.95	2.88	3.16	2.67	5.40	0.43
W-5	7.67	4.57	3.10	4.83	2.84	4.65	3.02	4.97	2.70
W-6	8.80	4.93	3.87	5.28	3.52	5.46	3.34	5.31	3.49
W-7	7.44	4.37	3.07	3.21	4.23	6.14	1.30	6.67	0.77
W-8	5.62	4.90	0.72	2.79	2.83	3.81	1.81	3.98	1.64
W-9	8.76	5.25	3.51	5.39	3.37	5.32	3.44	5.46	3.30
W-10	9.08	5.09	3.99	5.34	3.74	5.49	3.59	5.46	3.62
W-11	8.61	4.81	3.80	4.80	3.81	4.30	4.31	4.90	3.71
W-12	9.16	6.62	2.54	6.44	2.72	5.88	3.28	6.58	2.58
W-13	8.85	4.73	4.12	5.05	3.80	5.39	3.46	5.22	3.63
W-14	9.03	5.16	3.87	5.35	3.68	5.46	3.57	5.52	3.51
W-15	9.04	5.25	3.79	5.41	3.63	5.43	3.61	5.50	3.54
W-16	7.29	3.83	3.46	3.82	3.47	3.82	3.47	3.63	3.66
W-17	6.64	3.65	2.99	2.65	3.99	5.14	1.50	5.77	0.87
W-18	7.42	4.42	3.00	3.67	3.75	4.06	3.36	4.66	2.76
W-19	8.00	4.38	3.62	3.98	4.02	3.81	4.19	4.38	3.62
W-21	8.32	7.03	1.29	6.84	1.48	6.21	2.11	7.14	1.18
W-22	5.43	4.05	1.38	3.72	1.71	4.07	1.36	4.79	0.64
W-23	7.53	6.21	1.32	6.05	1.48	5.47	2.06	6.27	1.26
W-24	9.03	7.66	1.37	7.42	1.61	7.24	1.79	8.24	0.79
W-25	7.83	6.35	1.48	6.07	1.76	6.30	1.53	7.19	0.64
W-26	6.43	4.95	1.48	4.66	1.77	4.90	1.53	5.91	0.52

otes:
. All ground water elevations are reported in feet above mean sea level, except values in parentheses, which are feet below mean sea level.

. * = MW-3 could not be located on 01/14/88 due to heavy ice and snow on

AKH000656

FMT000797

945990457

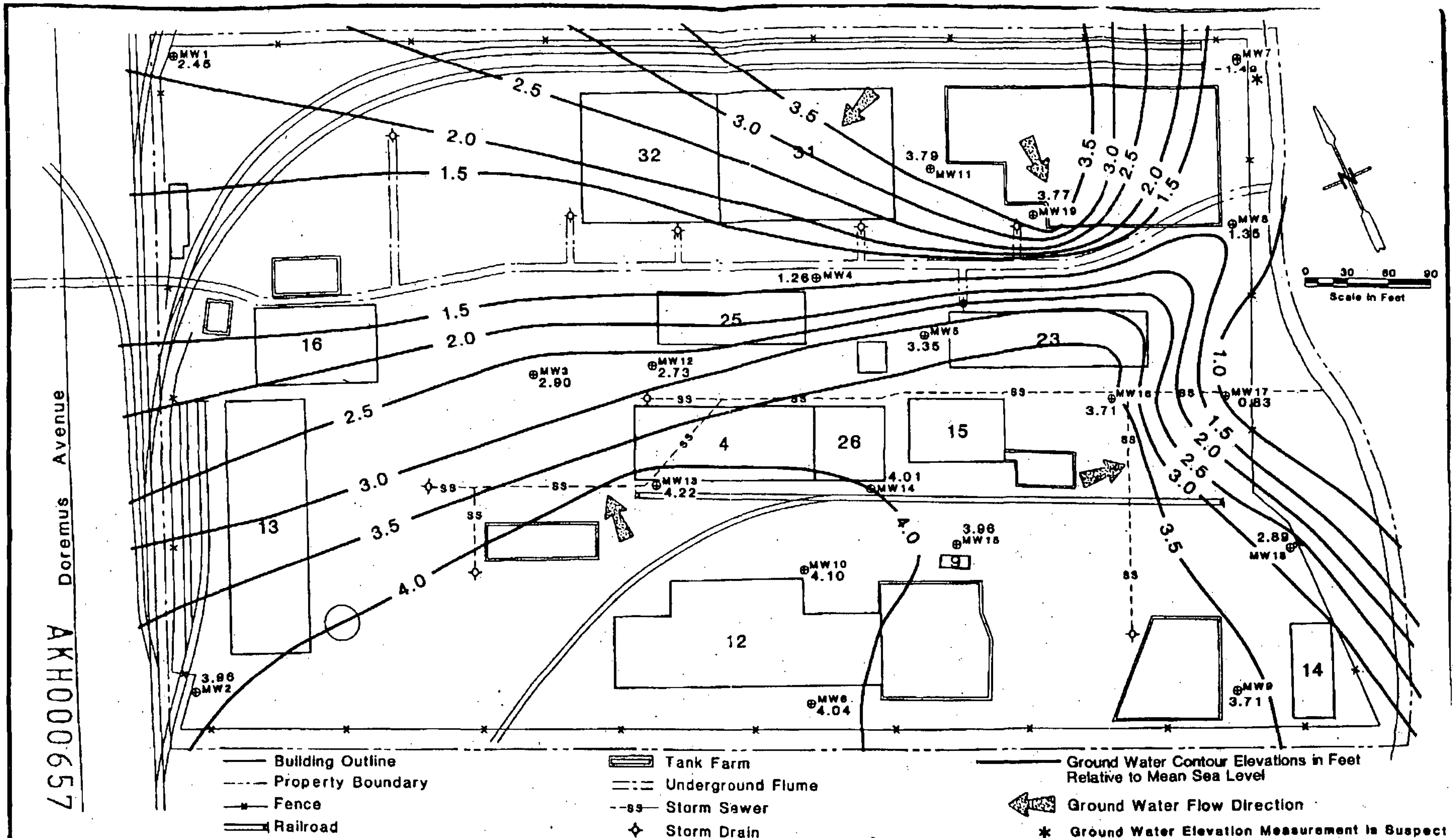


Figure III - 1

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, JANUARY 25, 1988

ENVIRON
Counsel in Health and Environmental Science

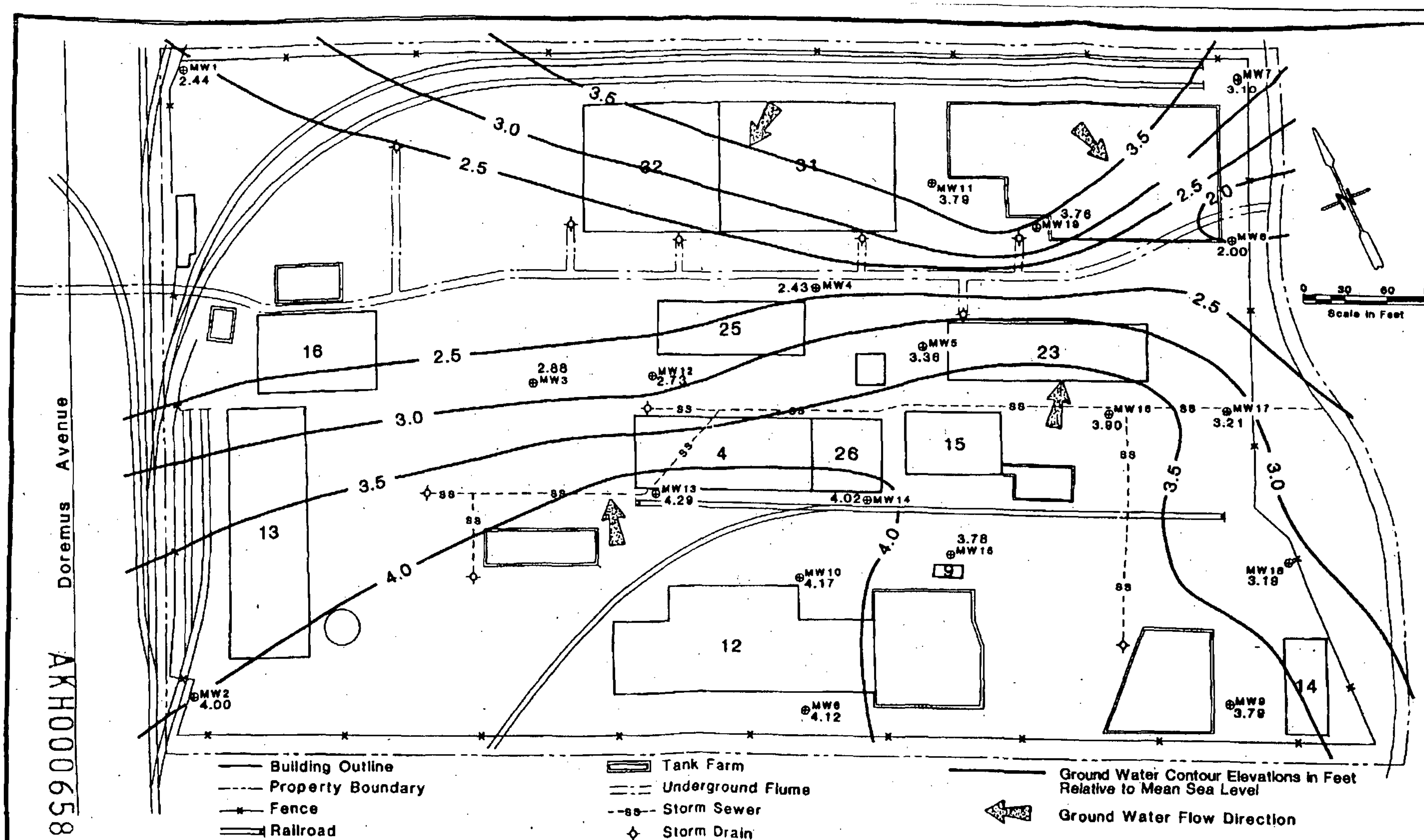


Figure III -2

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
HIGH TIDE, JANUARY 25, 1988

ENVIRON
Counsel in Health and Environmental Science

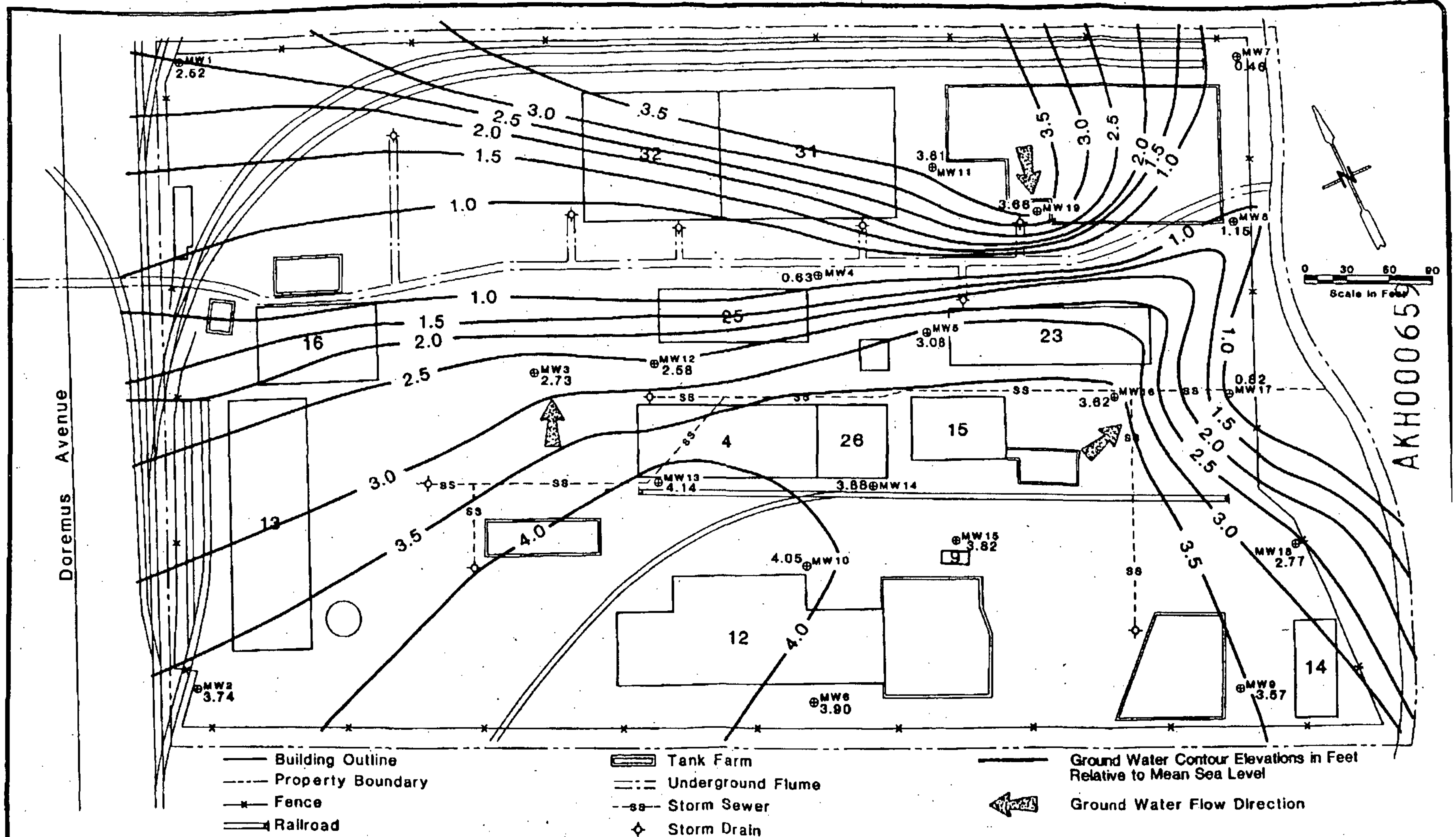


Figure III -3

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, MARCH 2, 1988

ENVIRON
Counsel in Health and Environmental Science

945990460

FM 00800

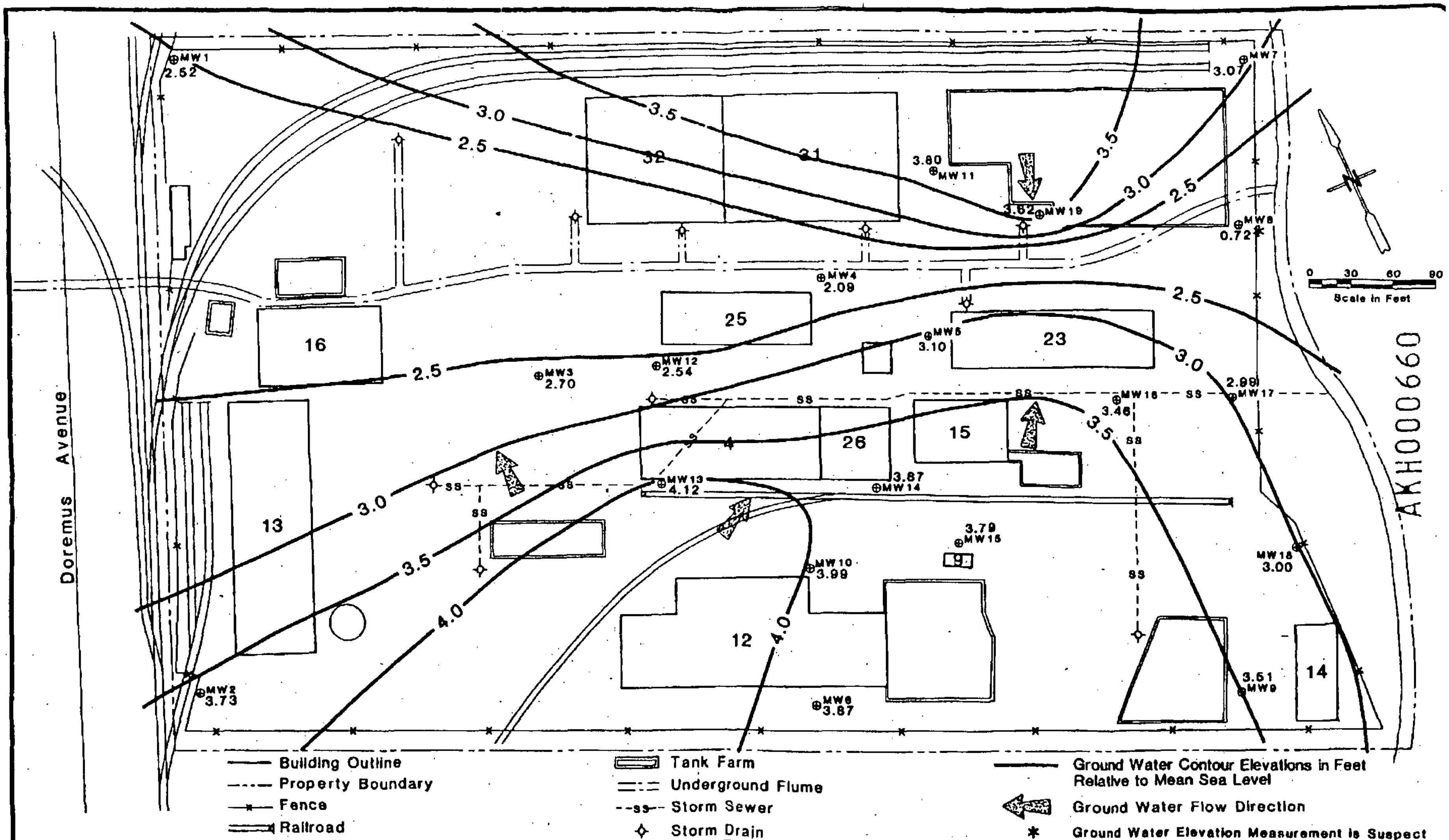


Figure III -4

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
HIGH TIDE, MARCH 2, 1988

ENVIRON
Counsel in Health and Environmental Science

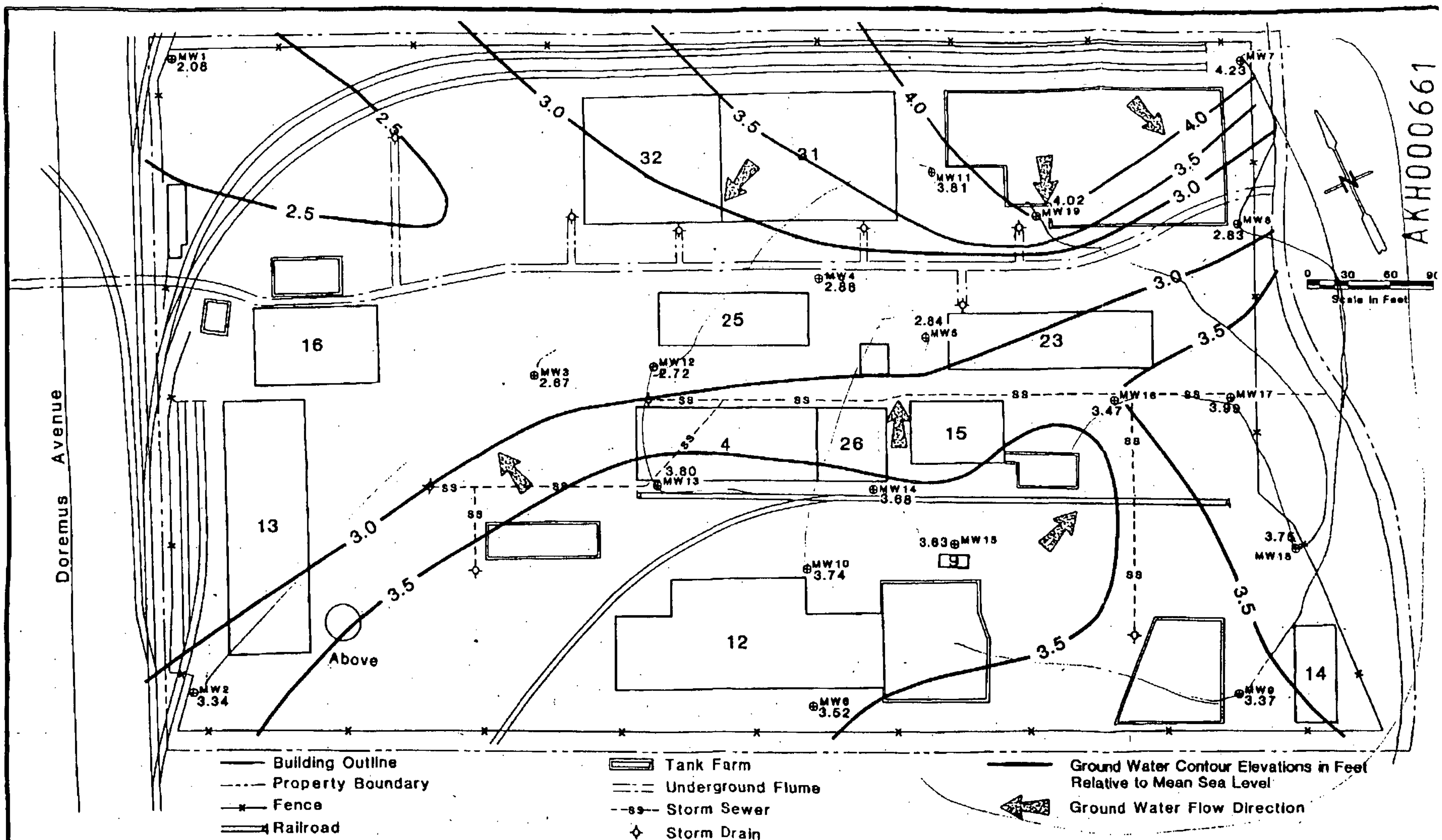


Figure III -5	SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS HIGH TIDE, MARCH 16, 1988	ENVIRON Counsel in Health and Environmental Science

AKH000661

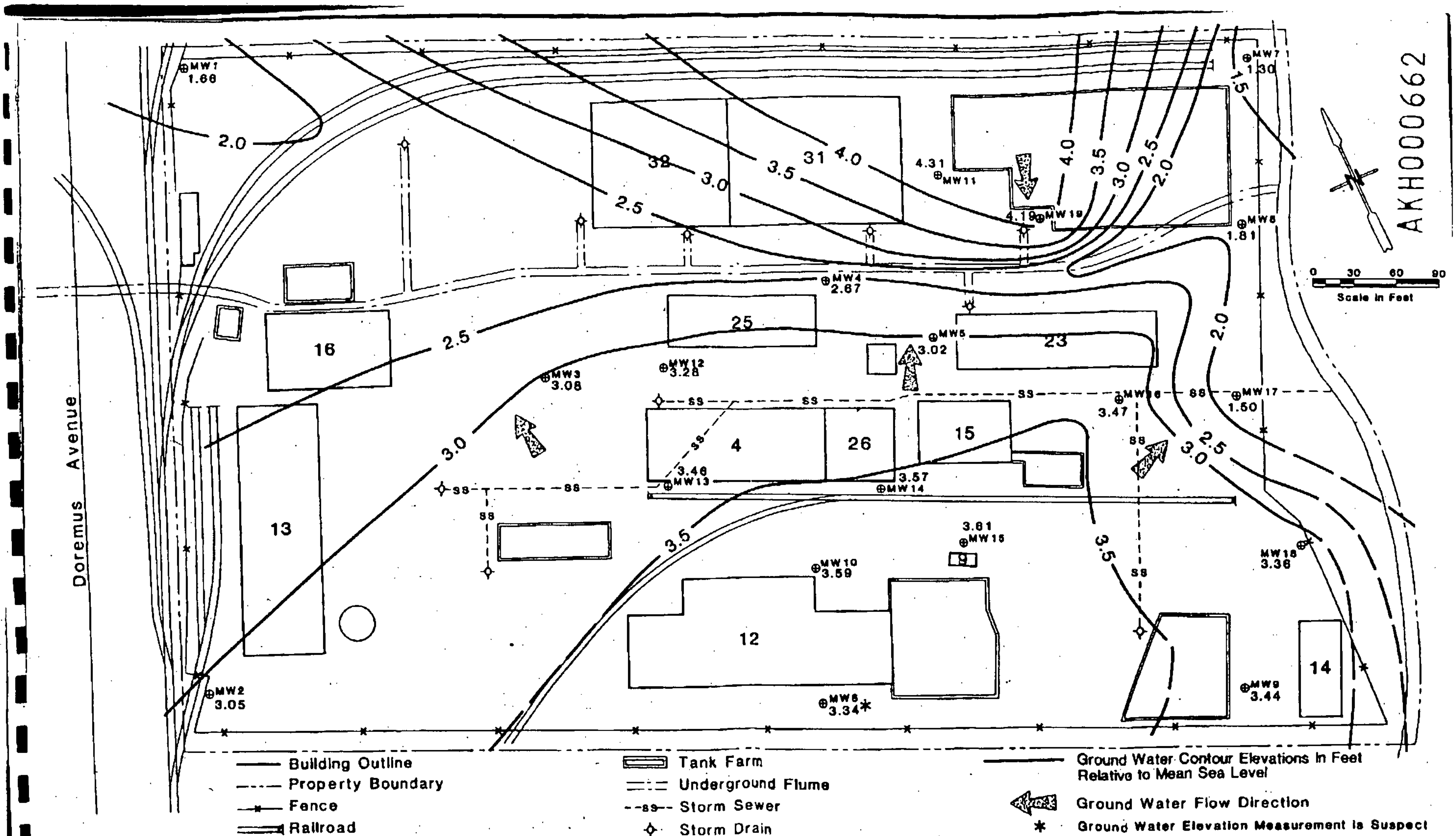


Figure III - 6	SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS LOW TIDE, APRIL 13, 1988	ENVIRON Counsel in Health and Environmental Science

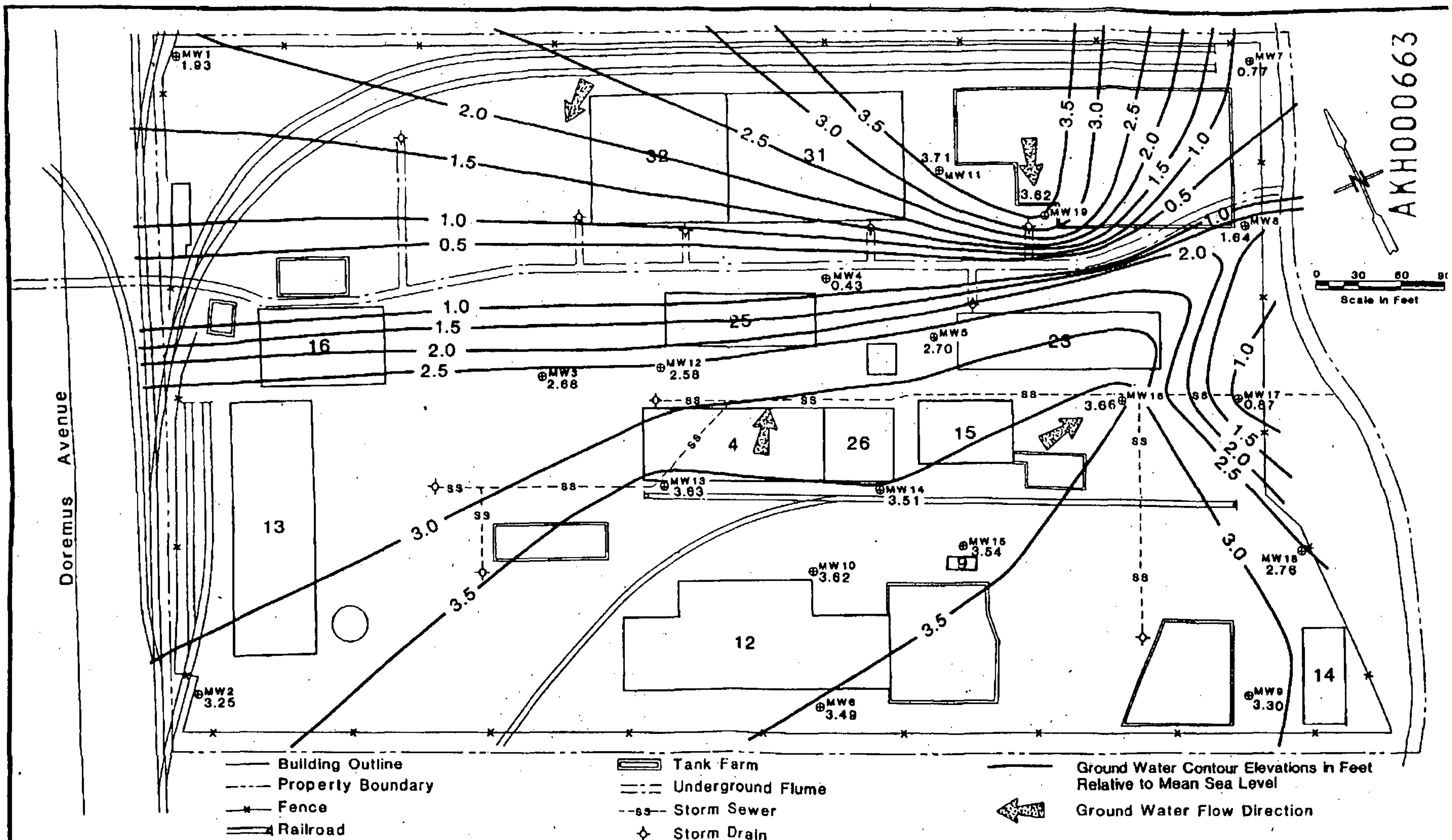


Figure III -7

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, APRIL 29, 1988

ENVIRON
Counsel in Health and Environmental Science

945990464

FM 00804

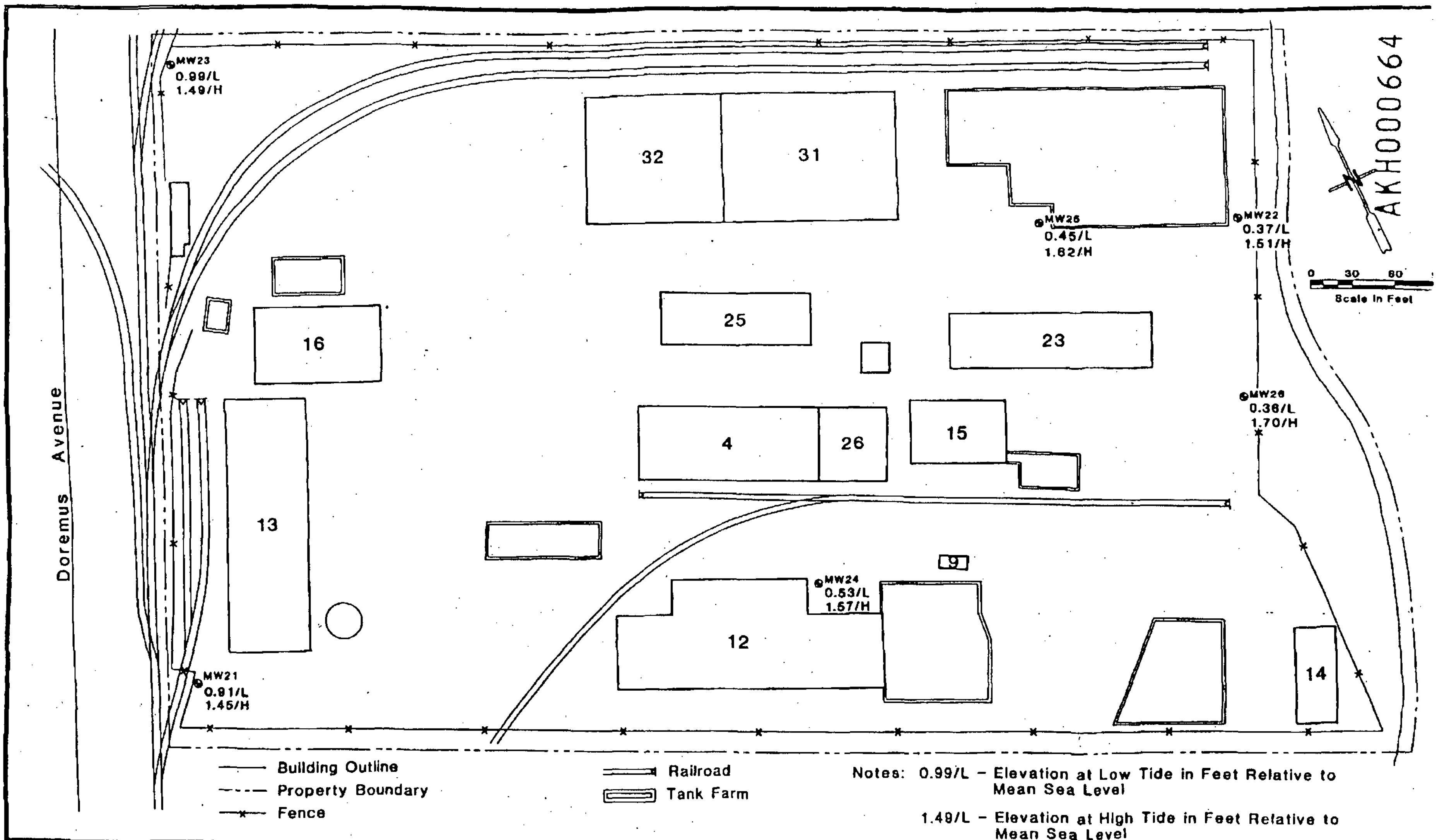


Figure III -8	DEEP AQUIFER GROUND WATER ELEVATIONS JANUARY 25, 1988	ENVIRON Counsel in Health and Environmental Science

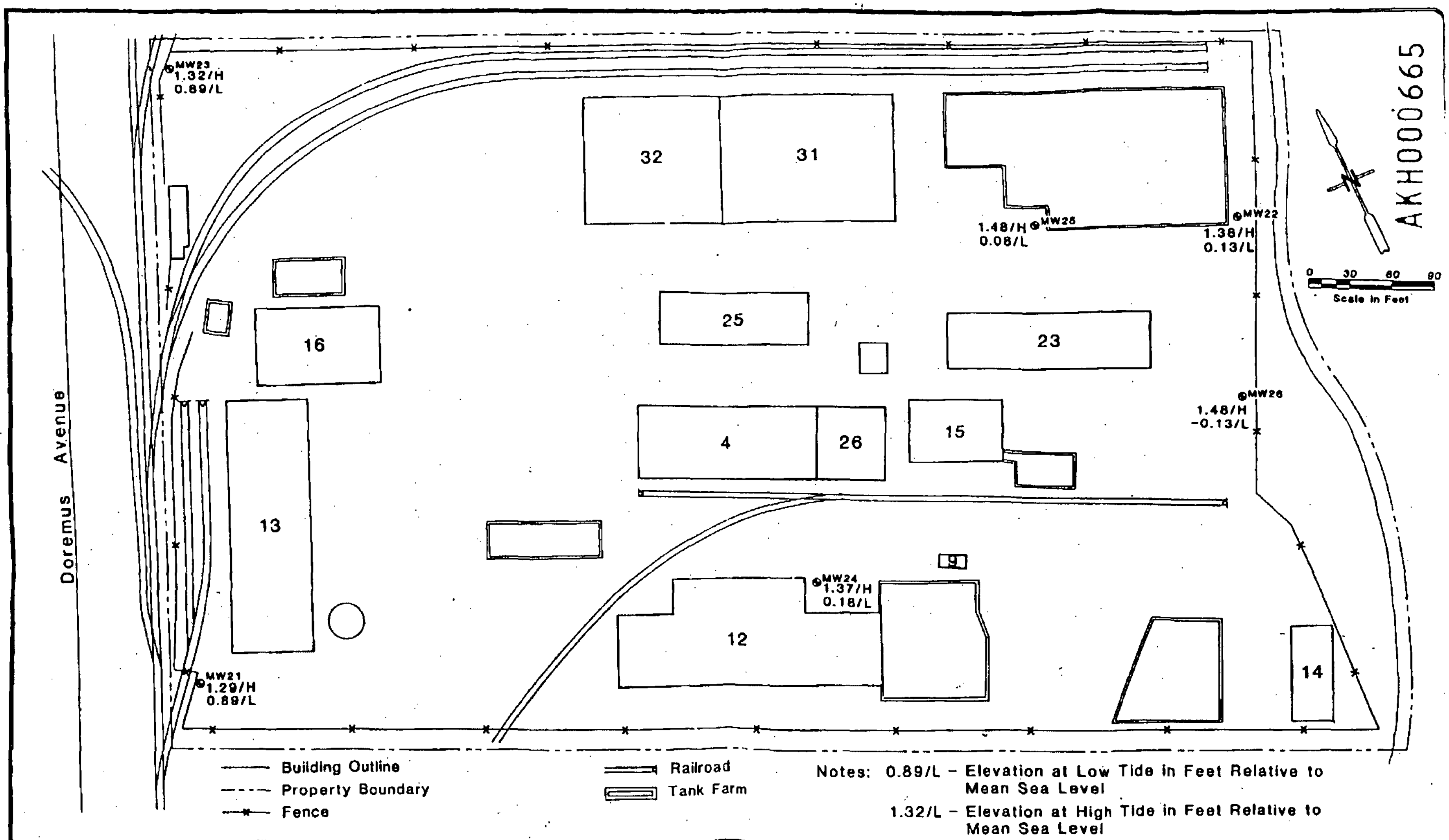


Figure III -9

DEEP AQUIFER GROUND WATER ELEVATIONS
MARCH 2, 1988

ENVIRON
Counsel in Health and Environmental Science

945990466

FM 00806

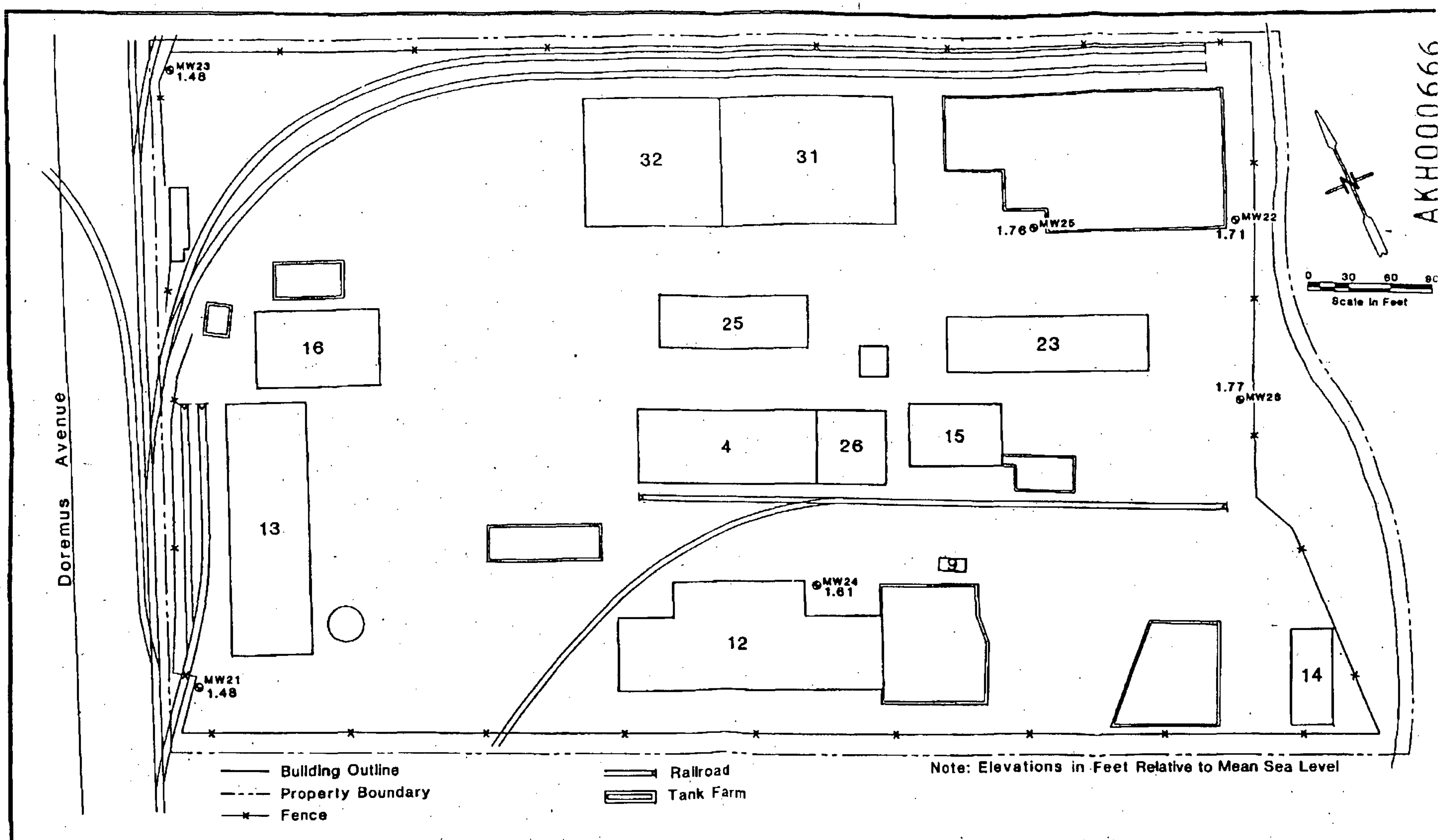


Figure III -10

DEEP AQUIFER GROUND WATER ELEVATIONS
HIGH TIDE MARCH 16, 1988

ENVIRON
Counsel in Health and Environmental Science

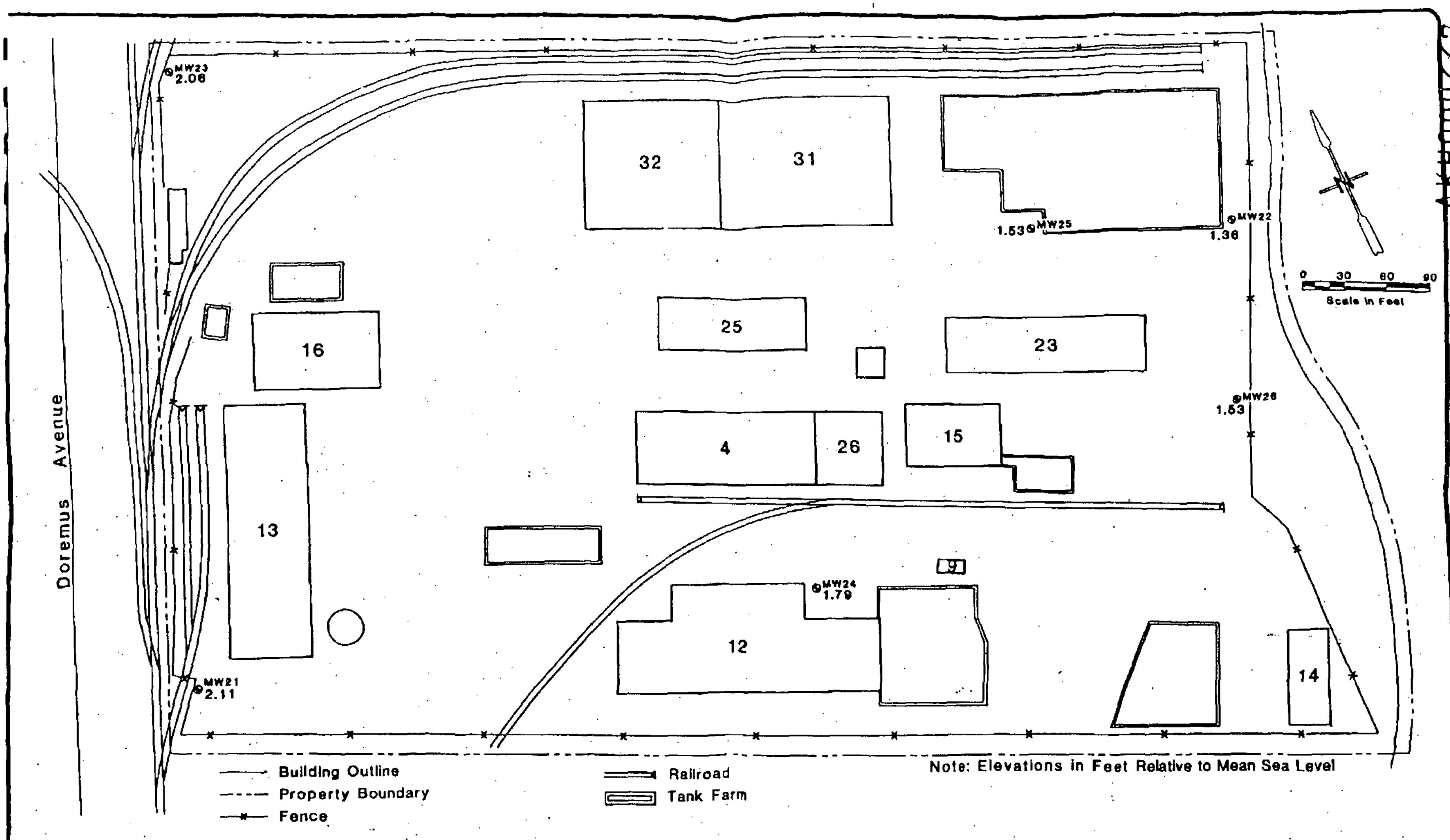


Figure III - 11

DEEP AQUIFER GROUND WATER ELEVATIONS
LOW TIDE APRIL 13, 1988

ENVIRON
Counsel in Health and Environmental Science

AKH000667

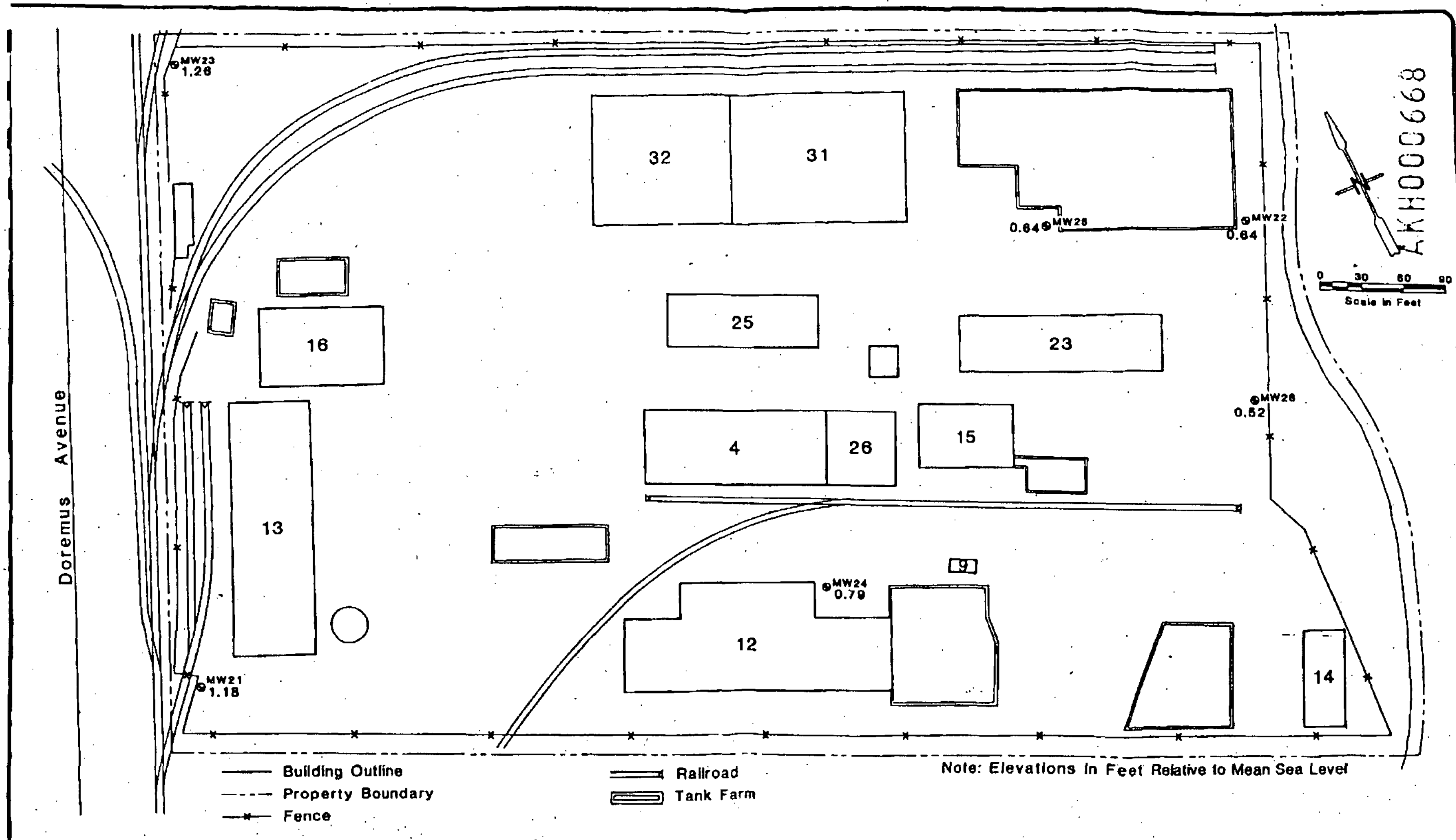


Figure III -12

DEEP AQUIFER GROUND WATER ELEVATIONS
LOW TIDE APRIL 29, 1988

ENVIRON
Counsel in Health and Environmental Science

AKH000668

There is no data to suggest that the storm sewer lacks physical integrity, because the penetration of the storm sewer conduit through the breakwall is the most likely cause of this ground water low. The effect of this discharge point is significantly less pronounced during high tide (Figure III-2) due to the backflow of water associated with this portion of the tidal cycle.

Ground water level measurements collected from deep aquifer monitoring wells indicate tidally-influenced flow patterns. Generally, the direction of flow during low tide is west to east (towards Newark Bay). Ground water level measurements during high tide suggest that the flow direction reverses during this portion of the tidal cycle. These ground water measurements confirmed the previous belief that the deeper aquifer is tidally influenced. Although the full extent of this tidal influence is not known, the effects of high tide are believed to be most pronounced in the eastern portion of the site. The differences observed in ground water elevations over both high and low tides, however, are sufficient to indicate that the tidally-induced flow reversal extends across the entire site.

IV. ANALYTICAL RESULTS

A. General

This section of the report provides the analytical results of the soil and ground water data collected during implementation of the Phase II Sampling Plan. Analytical results of soil samples collected from each tested AEC, monitoring well location and background location are provided in summary form. Overviews of the results from the dye testing in Building 26 and March 1988 ground water sampling are also provided within this section. The organization of the analytical data packages and the use of the informal ECRA cleanup guidelines are discussed below.

1. Analytical Data Packages

The analytical results received from Century Laboratories and Erco Laboratory are provided with this report under separate cover. These laboratory data packages meet NJDEP Tier II reporting requirements. The results of the analyses are tabulated by analytical parameter in Volumes II through V of this report. Volume II tabulates the PPM analyses for soil samples. Volume III tabulates the hydrocarbon fingerprinting analyses for soil samples. Volume IV tabulates the PPM, TPHC, VOC+15, and cyanide analyses for Phase II ground water samples. Volume V tabulates the PPM, TPHC and VOC+15 analyses for the March 1988 sampling round. Summary tables for all of these analyses, are provided in Appendix G.

2. Informal ECRA Cleanup Guidelines

The informal ECRA cleanup guidelines have been used as a preliminary basis for evaluating the levels of contaminants detected at this site. These guideline levels are presented in Appendix A. To correspond with these guidelines, the results of the soil analyses have been reported in parts per million (ppm) and the water analyses in parts per billion (ppb). Samples which were found to have contaminant concentrations greater than these cleanup levels are noted in the text. Although these cleanup levels are being used to perform a preliminary assessment of the results, neither ENVIRON nor Textron suggests that the informal ECRA cleanup guidelines provide an appropriate criteria for final analysis of the results or for determining the need for cleanup at the Spencer Kellogg facility.

B. Summaries of Soil Results for Areas of Environmental Concern

1. Area of Environmental Concern 3

AEC 3 is an area of the site along the railroad tracks adjacent to Buildings 31 and 32 in which finished resin product may have been spilled during railroad car loading. Surface samples were collected from two locations (borings 304 and 305) and analyzed for PPMs and hydrocarbon fingerprinting. Mercury was found above the informal

ECRA cleanup guideline in both soil samples. The sample collected from boring 304 also contained levels of chromium slightly above the informal ECRA cleanup guideline.

GC/FID and gravimetric fingerprinting analyses of the boring 304 soil sample indicate petroleum hydrocarbon concentrations of 720 ppm and 1330 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, kerosene, 4- to 5-ring polynuclear aromatic hydrocarbons and a petroleum product in the fuel oil/lubricating oil range. The fatty acid (non-petroleum hydrocarbon) fraction contained a total lipid equivalent concentration of 840 ppm and was qualitatively identified as soybean oil.

GC/FID and gravimetric fingerprinting analyses of the boring 305 sample indicate petroleum hydrocarbon concentrations of 5,900 ppm and 1,750 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, gasoline and coal tar. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 52,000 ppm and was qualitatively identified as soybean oil.

2. Area of Environmental Concern 4

AEC 4 is located immediately east of AEC 3 along the railroad tracks. Two samples were collected from boring location 403. The first sample was collected just below the ground surface and fingerprinted for hydrocarbons as well as analyzed for PPMs. The second sample was collected from an interval just above the water table, approximately two feet below the ground surface, and analyzed for PPMs. Priority pollutant metals were not detected at levels above the informal ECRA cleanup guidelines in the surficial sample. Cadmium, however, was detected at levels in excess of the informal ECRA cleanup guideline in the deeper sample.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 1,440 ppm and 970 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of No. 6 fuel oil, gasoline and another petroleum product in the fuel oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 160,000 ppm and was qualitatively identified as soybean oil.

3. Area of Environmental Concern 10

AEC 10 is currently used for the storage of drummed raw materials. Two soil samples were collected from boring location 1002 and tested for PPMs. The surficial sample was also fingerprinted for hydrocarbons. The sampling depths corresponded to the interval immediately below the ground surface and the interval immediately above the water table, approximately two and a half to three feet below the ground surface. PPMs at levels above informal ECRA cleanup guidelines were not detected in either sample.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 36 ppm and 750 ppm, respectively. A duplicate analysis reported GC/FID and gravimetric analytical results of 30 ppm and 1,580 ppm of petroleum hydrocarbons, respectively. The petroleum hydrocarbon fractions from both samples were qualitatively identified by their GC/FID characteristic as 4- and 5- ring polynuclear aromatic hydrocarbons. Fatty acids were not detected in either sample.

4. Area of Environmental Concern 13

AEC 13 is an area where four aboveground storage tanks were located when this portion of the site was unpaved. One surficial soil sample, collected from boring 1304, was fingerprinted for hydrocarbons and analyzed for PPMs. Priority pollutant metals above informal ECRA cleanup guidelines were not detected in this sample.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 238 ppm and 1,080 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified as a petroleum product in the No. 6 fuel oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 16,000 ppm and was qualitatively identified as castor oil.

5. Area of Environmental Concern 14

AEC 14 is a portion of the site in which several aboveground storage tanks were previously located while this area was unpaved. One soil sample from boring 1404 was collected immediately below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. Results of the metal analyses do not indicate levels in excess of informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 670 ppm and 2,010 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, light and heavy fuel oils, gasoline and a petroleum product in the fuel oil or lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 520 ppm and was qualitatively identified as soybean oil.

6. Area of Environmental Concern 15

AEC 15 is a portion of the site formerly used for drum storage when the area was unpaved. One soil sample from boring 1505 was collected just below the pavement. This sample was analyzed for

PPMs and hydrocarbon fingerprinting. Zinc marginally exceeded the informal ECRA cleanup guideline. Lead was also found at levels above informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 60 ppm and non-detect, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as gasoline. Fatty acids were not detected in this sample.

7. Area of Environmental Concern 16

AEC 16 is a portion of the site used for drum storage while the area was unpaved. One soil sample from boring 1604 was collected immediately below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. Levels of metals did not exceed informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 1,260 ppm and 1,480 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 6,700 ppm and was qualitatively identified as soybean oil.

8. Area of Environmental Concern 17

AEC 17 is an area formerly used for drum storage while this portion of the site was unpaved. Soil samples were collected immediately below the ground surface from borings 1704, 1705 and MW24. All samples were fingerprinted for hydrocarbons and analyzed for PPMs. Analytical results of soil samples collected within AEC 17 indicate levels of lead, mercury, and/or zinc, copper and antimony above informal ECRA cleanup guidelines. The highest concentration of metals in AEC 17 were detected in the soil sample collected from boring location MW24.

The GC/FID and gravimetric fingerprinting analyses for the soil sample collected from boring 1704 indicate petroleum hydrocarbon concentrations of 2,160 ppm and 4,900 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as lubricating oil with 4- to 5-ring polynuclear aromatic hydrocarbons. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 1,700 ppm and was qualitatively identified as soybean oil.

The GC/FID and gravimetric fingerprinting analyses for the soil sample collected from boring 1705 indicate petroleum hydrocarbon concentrations of 450 ppm and 500 ppm, respectively. The duplicate analysis indicated GC/FID and gravimetric values of 229 ppm and 460 ppm of petroleum hydrocarbons, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil/lubricating oil range and coal tar. Only one of the duplicate samples had a detectable fatty acid fraction. The fatty acid fraction of the duplicate sample contained a total lipid equivalent concentration of 48 ppm and was qualitatively identified as soybean oil.

The GC/FID and gravimetric fingerprinting analyses for the sample collected from boring location MW24 indicate petroleum hydrocarbon concentrations of 650 ppm and 2,070 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of a petroleum product in the fuel oil/lubricating oil range, gasoline and polynuclear aromatic hydrocarbons. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 67 ppm and was qualitatively identified as soybean oil.

9. Area of Environmental Concern 19

AEC 19 is located within the diked area around Tank 300. This tank was previously used to store a waste resin solution. One grab sample (1902) was collected at the surface and fingerprinted for hydrocarbons.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 1,030 ppm and 900 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, a petroleum product in the fuel oil/lubricating oil range and gasoline. The fatty acid fraction of this sample had a total lipid equivalent concentration of 16,000 ppm and was qualitatively identified as soybean oil.

10. Area of Environmental Concern 21

AEC 21 represents the former location of a number of aboveground tanks while the area was unpaved. One soil sample from boring 2104 was collected immediately below ground surface and analyzed for PPMs and fingerprinted for petroleum hydrocarbons. Seven metals, including antimony, arsenic, cadmium, copper, lead, mercury and zinc, were found to exceed informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 12,000 ppm and 1,860 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, gasoline and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample had a total lipid equivalent concentration of 5,100 ppm and was qualitatively identified as soybean oil.

11. Area of Environmental Concern 23

AEC 23, located adjacent to Building 4, is an active product loading area where a hazardous waste resin solution may have been generated in the past. Two samples were collected from boring location 2302. The first sample was collected immediately below ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. The second sample was collected from an interval just above the water table, approximately two to three feet below the ground surface, and analyzed for PPMs. Metals exceeding informal ECRA cleanup guidelines in both samples include cadmium, copper, lead, mercury and zinc. With the exception of cadmium, metal concentrations decreased with depth.

The GC/FID and gravimetric fingerprinting results of the surficial sample indicate petroleum hydrocarbon concentrations of 1,240 ppm and 8,800 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, fuel oils and 4- to 5-ring polynuclear aromatic hydrocarbons. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 250 ppm and was qualitatively identified as soybean oil.

12. Area of Environmental Concern 25

AEC 25 is a tank wagon loading area outside of Building 26 in which waste resin solutions may have been generated. One soil sample was collected immediately below ground surface from boring 2502 and fingerprinted for hydrocarbons and analyzed for PPMs. Two metals, lead and silver, were found to exceed informal ECRA cleanup guidelines, though the concentration of lead (268 ppm) was just slightly above the ECRA criterion. This is the only Phase II sample found to contain levels of silver in excess of informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 3,350 ppm and 1,880 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil/lubricating oil range and coal tar. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 16,000 ppm and was qualitatively identified as linseed oil.

C. Summaries of Soil Results from Monitoring Well Locations

1. Boring MW12

Monitoring well 12 is located between Buildings 4 and 25, adjacent to the tank farm which surrounds AEC 11. MW12 was installed to evaluate the potential impact on ground water quality downgradient from AEC 12, the area which contains the highest concentrations of VOCs and TPHCs in on-site soils. Soil samples were collected during the installation of MW12 immediately below the ground surface and from an interval immediately above the water table. A duplicate sample was also collected immediately below the ground surface. All samples were analyzed for PPMs and an additional surficial sample was collected and fingerprinted for hydrocarbons. Analytical results of the shallow duplicate samples indicate levels of lead, nickel, zinc and copper in excess of informal ECRA cleanup guidelines. The "at depth" sample contained concentrations of antimony, cadmium, copper and zinc above informal ECRA cleanup guidelines.

The fingerprinting results indicate GC/FID and gravimetric petroleum hydrocarbon concentrations of 930 ppm and 11,000 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as lubricating oil. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 120 ppm and was qualitatively identified as soybean oil.

2. Boring MW13

Monitoring well 13 is located near the southwest corner of Building 4. One soil sample was collected during the installation of MW13 immediately below ground surface and was analyzed for PPMs and fingerprinted for hydrocarbons. Copper, lead, mercury and zinc exceeded informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 1,170 ppm and 1,470 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil/lubricating oil range and coal tar. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 1,900 ppm and was qualitatively identified as soybean oil.

3. Boring MW14

Monitoring well 14 was installed adjacent to the southeast corner of Building 26. One soil sample was collected during the installation of MW14 just below the pavement and analyzed for PPMs and fingerprinted for hydrocarbons. Copper, lead, mercury and zinc were the only metals found above informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 650 ppm and 1,730 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of polynuclear aromatic hydrocarbons and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 170 ppm and was qualitatively identified as castor oil.

4. Boring MW15

Monitoring well 15 is located next to Building 9. Two soil samples were collected during the installation of MW15. The first sample, collected at a depth just below the pavement, was analyzed for PPMs and fingerprinted for hydrocarbons. The second sample was collected immediately above the ground water table (approximately three feet below grade) and analyzed for PPMs only.

The metal concentrations in the surficial sample contained lead and zinc above informal ECRA cleanup guidelines. The "at depth" sample also contained lead and zinc at even greater concentrations. In addition, copper and mercury above informal ECRA cleanup guidelines were detected in the deeper sample. Concentrations of metals typically increased with depth.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 660 ppm and 9,100 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of polynuclear aromatic hydrocarbons and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 100 ppm and was qualitatively identified as soybean oil.

5. Boring MW16

Monitoring well 16 was installed approximately 25 feet south of Building 23 near the juncture of two sewer lines. Soil samples were collected during the installation of MW16 immediately below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. A duplicate sample was also collected just below the ground surface and analyzed for PPMs. Both samples contained levels of some metals above informal ECRA cleanup guidelines, including cadmium, copper, lead, mercury, nickel and zinc.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 800 ppm and 1,150 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of coal tar and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample had a total lipid equivalent concentration of 150 ppm and was qualitatively identified as castor oil.

6. Boring MW17

Monitoring well 17 is located near the discharge point of the storm sewer into Newark Bay. Two soil samples were collected during the installation of MW17, one just below the ground surface and the other just above the water table. The surface sample was analyzed for PPMs and fingerprinted for hydrocarbons. Only zinc was found to exceed informal ECRA cleanup guidelines in this sample. The deeper soil sample was also collected and analyzed for PPMs. Copper, lead, nickel and zinc were found to exceed informal ECRA cleanup guidelines in the deeper sample. Metal concentrations typically increased with depth.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 205 ppm and 220 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil/lubricating oil range. Fatty acids or non-petroleum hydrocarbons were not detected.

7. Boring MW18

Monitoring well 18 was placed adjacent to Newark Bay in a presumed downgradient direction from AEC 21. Soil samples, including a duplicate, were collected during the installation of MW18 at an interval just below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. Lead, zinc, mercury and copper were found to be above the informal ECRA cleanup guidelines in both samples. Cadmium slightly exceeded the informal guideline in one of the samples.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 260 ppm and 630 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of a petroleum product in the fuel oil/lubricating oil range and polynuclear aromatic hydrocarbons.

8. Boring MW19

Monitoring well 19 was installed adjacent to the large tank farm which comprises AEC 26 to monitor the effects, if any, of the activities associated with AEC 26 on ground water quality in the shallow aquifer. Surface cover at this location consisted of thirty inches of steel reinforced concrete. A soil sample was collected immediately below the concrete during well installation and analyzed for both PPMs and hydrocarbon fingerprinting. No metals were found to exceed the informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 6 ppm and non-detect, respectively. Fatty acids or non-petroleum hydrocarbons were not detected.

9. Boring MW24

Monitoring well 24 is a telescoped deep well located adjacent to MW10 to monitor whether contamination in the shallow fill material has infiltrated through the confining layer and into the deep aquifer. The analytical results of soil samples collected from this location are included in the previous discussion of AEC 17.

10. Boring MW25

Monitoring well 25 is a telescoped deep well located immediately adjacent to MW19. Due to the existence of thick concrete and poor split spoon recovery, a soil sample could not be collected above the water table. A sample was collected below the apparent water table, however, and fingerprinted for hydrocarbons. The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 5.8 ppm and non-detect, respectively. Fatty acids or non-petroleum hydrocarbons were not detected.

11. Boring MW26

Monitoring well 26 is a telescoped deep well located adjacent to MW17. Soil samples collected during well installation were analyzed for PPMs and fingerprinted for hydrocarbons. Duplicate samples were collected at the surface and also analyzed for PPMs. The samples contained chromium, copper, lead, nickel, zinc and/or antimony above informal ECRA cleanup guidelines. A second soil sample was collected just above the water table and analyzed for priority pollutant metals. This sample contained only lead, copper and zinc at levels above the guidelines.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 180 ppm and 236 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil lubricating range. Additionally, no fatty acids or non-petroleum hydrocarbons were detected.

D. Summaries of Soil Results from Background Borings

1. Background Boring 001

Boring 001 is located near the fence along the southern property boundary. One soil sample was collected and analyzed for PPMs. No metals were found to exceed the informal ECRA cleanup guidelines.

2. Background Boring 002

Boring 002 is located near the fence along the southern property boundary, south of AEC 22. Surficial and "at depth" soil samples were collected and analyzed for PPMs. The sample collected immediately below the pavement did not contain any metals in excess of informal ECRA cleanup guidelines. The sample collected immediately above the water table contained cadmium, copper, lead, mercury and zinc at levels above informal ECRA cleanup guidelines. Metal contamination increased with depth at this location.

3. Background Boring 003

Boring 003 is located east of Building 13. One sample was collected and analyzed for PPMs. Metals in excess of informal ECRA cleanup guidelines were not detected in this sample.

4. Background Boring 004

Boring 004 is located just south of Building 32. Two soil samples, one collected just below the pavement and the other just above the water table, were analyzed for PPMs. Neither sample contained levels of metals in excess of informal ECRA cleanup guidelines.

5. Background Boring 005

Boring 005 is located near Newark Bay along the fence, adjacent to monitoring wells 8 and 22. One soil sample collected just below ground surface was analyzed for PPMs. Lead and zinc were found to exceed informal ECRA cleanup guidelines. A second soil sample collected immediately above the water table was also analyzed for PPMs. This sample did not contain any metals in excess of informal ECRA cleanup guidelines.

E. Shallow Ground Water

1. Monitoring Well 1

Monitoring well 1 is a Phase I shallow well which was installed in the northwest corner of the site to monitor flow and quality of the shallow ground water in this area. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead and TPHC were found to exceed informal ECRA cleanup guidelines. TPHC was not detected in this well during the previous sampling round associated with the Phase I Sampling Plan. All other analytical results indicate levels of constituents below the minimum laboratory detection limit or below informal ECRA cleanup guidelines.

2. Monitoring Well 2

Monitoring well 2 is a Phase I shallow well which was installed in the southwest corner of the property to monitor flow and quality of the shallow ground water in this portion of the site. Duplicate ground water samples were collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. TPHCs were found in both samples to exceed informal ECRA cleanup guidelines. All other analytical results indicated levels of constituents below the informal ECRA cleanup guidelines.

3. Monitoring Well 3

Monitoring well 3 is a Phase I shallow well which was installed in the presumed downgradient direction from AEC 10 in order to monitor the quality of the shallow ground water in this portion of the site. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results indicated levels of constituents either below the minimum laboratory detection limits or below informal ECRA cleanup guidelines.

4. Monitoring Well 4

Monitoring well 4, a Phase I shallow well, is located along the underground flume near the middle of the site and was installed to monitor ground water quality in this area. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs.

Only the levels of chromium, lead and cadmium were above informal ECRA cleanup guidelines.

5. Monitoring Well 5

Monitoring well 5 is a Phase I shallow well located approximately 15 feet west of Building 23. Monitoring well 5 was installed in the presumed downgradient direction from AEC 11 to monitor the quality of the shallow ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines.

6. Monitoring Well 6

Monitoring well 6, a Phase I shallow well, was centrally located along the southern border of the property to monitor flow and quality of the shallow ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines.

7. Monitoring Well 7

Monitoring well 7, a Phase I shallow well, was placed in the northeast corner of the property to monitor shallow ground water flow and quality in an apparent downgradient area of the site. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead was the only constituent found to exceed informal ECRA cleanup guidelines.

8. Monitoring Well 8

Monitoring well 8 is a Phase I shallow well located between the large tank farm and the fence along Newark Bay. Monitoring well 8 was installed in the presumed downgradient direction from AECs 7 and 26 to monitor the quality of the shallow ground water. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines, with the exception of cadmium (13 ppb) which slightly exceeded the informal ECRA cleanup guidelines.

9. Monitoring Well 9

Monitoring well 9, a Phase I shallow well located near the southeast corner of the site next to AEC 20, was installed to monitor the effects, if any, of AEC 20 on shallow ground water quality. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. With the exception of lead, all analytical results were below informal ECRA cleanup guidelines.

10. Monitoring Well 10

Monitoring well 10, a Phase I shallow well located just north of Building 12, was installed to monitor the effects, if any, of the activities associated with AEC 17 on ground water quality in the shallow aquifer. A ground water sample was collected and analyzed for TPHCs, PPMs, cyanide and VOC+15. Most PPM, TPHC and cyanide results were below informal ECRA cleanup guidelines. Lead and total VOCs, however, exceeded informal ECRA cleanup guidelines. A single volatile compound, toluene, was detected in the VOC+15 search.

11. Monitoring Well 11

Monitoring well 11 is a Phase I shallow well installed between the large tank farm and Building 31 to monitor the effects, if any, of the activities associated with AECs 6, 27 and 28 on ground water quality in the shallow aquifer. One ground water sample was collected and analyzed for PPMs, cyanide, VOC+15 and TPHCs. All results were below informal ECRA cleanup guidelines.

12. Monitoring Well 12

Monitoring well 12, a Phase II shallow well, is located west of AEC 11. Monitoring well 12 was installed to monitor the quality of the shallow ground water downgradient from AEC 12, the area which contains the highest concentration of VOCs and TPHCs in soils on-site. One ground water sample was collected and analyzed for PPMs, cyanide, VOC+15 and TPHCs. All analytical results were below informal ECRA cleanup guidelines.

13. Monitoring Well 13

Monitoring well 13 is a Phase II shallow well installed near the southwest corner of Building 4 to monitor the extent, if any, of the contaminant plume emanating from the vicinity of MW10 and to monitor the shallow ground water upgradient from AEC 12. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead and total volatile organics exceeded informal ECRA cleanup guidelines. The only volatile compound found in MW13 was ethylbenzene (110 ppb).

14. Monitoring Well 14

Monitoring well 14 was installed near the southwest corner of Building 26 to monitor the extent, if any, of the contaminant plume emanating from the MW10 area. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead was the only constituent that exceeded informal ECRA cleanup guidelines.

15. Monitoring Well 15

Monitoring well 15 is a Phase II shallow well located north of Building 9 and was installed to monitor the extent, if any, of the contaminant plume emanating from the MW10 area. Duplicate ground water samples were collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead exceeded informal ECRA cleanup guidelines in both samples.

16. Monitoring Well 16

Monitoring well 16 is a Phase II shallow well installed near the juncture of two sewer lines, approximately 25 feet south of Building 23, to determine the effects, if any, of the sewer system on the shallow ground water. One ground water sample was collected and analyzed for PPMs, TPHCs, VOC+15 and cyanide. All of the TPHC, VOC+15 and cyanide analytical results were below informal ECRA cleanup guidelines. However, the levels of arsenic, cadmium, chromium, copper, lead, mercury and zinc were above informal ECRA guidelines.

17. Monitoring Well 17

Monitoring well 17 is a Phase II shallow well installed adjacent to the sewer line along Newark Bay to determine the effects, if any, of the sewer system on the shallow ground water. One ground water sample was collected and analyzed for PPMs, VOC+15, TPHCs and cyanide. The analytical results for volatiles, TPHCs and cyanide were below informal ECRA cleanup guidelines. The metal analyses, however, indicated levels of cadmium, chromium, lead and mercury exceeding informal ECRA cleanup guidelines.

18. Monitoring Well 18

Monitoring well 18 is a Phase II shallow well located along Newark Bay approximately 50 feet north of Building 14. Monitoring well 18 was installed in the presumed downgradient direction from AEC 21 in order to monitor the quality and flow of the shallow ground water. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Only lead exceeded the informal ECRA cleanup guideline.

19. Monitoring Well 19

Monitoring well 19 is a Phase II shallow well located adjacent to the large tank farm comprising AEC 26 and was installed to monitor the effects, if any, of the activities associated with AEC 26 on ground water quality in the shallow aquifer. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Arsenic, cadmium, chromium, lead and mercury exceeded informal ECRA cleanup guidelines.

F. Deep Ground Water

1. Monitoring Well 21

Monitoring well 21 is a Phase I telescoped deep well located adjacent to monitoring well 2 in the southwest corner of the property. MW21 was installed to monitor flow and quality of the deeper ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

2. Monitoring Well 22

Monitoring well 22 is a Phase I telescoped deep well adjacent to monitoring well 8 and located between the large tank farm and Newark Bay. Monitoring well 22 was installed to monitor the quality of the deeper ground water in a presumed downgradient portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines with the exception of lead.

3. Monitoring Well 23

Monitoring well 23 is a Phase I telescoped deep well located adjacent to monitoring well 1 in the northwest corner of the property. MW23 was installed to monitor flow and quality of the deeper ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

4. Monitoring Well 24

Monitoring well 24 is a Phase II telescoped deep well located north of Building 12 and paired with Phase I shallow monitoring well 10. MW24 was installed to monitor whether the observed contamination in the shallow aquifer at this location has infiltrated through the confining layer and into the deep aquifer. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

5. Monitoring Well 25

Monitoring well 25 is a Phase II telescoped deep well located near the southwest corner of the large tank farm and paired with Phase II shallow well monitoring well 19. Monitoring well 25 was installed to determine the nature and extent, if any, of deep ground water contamination in this area of the site. Duplicate ground water samples were collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

6. Monitoring Well 26

Monitoring well 26 is a Phase II telescoped deep well located near the storm sewer line along Newark Bay and paired with MW17, a Phase II shallow well. MW26 was installed to monitor both ground water elevation and ground water quality at the downgradient edge of the deep aquifer. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines with the exception of TPHCs.

G. Building 26 Floor Drain Results

Dye tests were conducted during the implementation of the Phase I Sampling Plan to determine the discharge point(s) of the floor drains in Building 26. The results of these Phase I tests did not conclusively identify the discharge point(s). One of the objectives of the Phase II Sampling Plan was to conduct additional tests to determine the location(s) of the outfall of the Building 26 floor drains.

A smoke test was initially performed because the Phase I dye testing did not provide conclusive results. No smoke leaks were detected that would indicate the outfall of the drain. Dye tracing was then performed in an attempt to locate the drain outfall. Visual observations of the test indicated dye exiting from the ground in an area near a roof drain pipe and along the northern base of Building 26, suggesting that the drainage pipe underneath the flooring lacks physical integrity.

H. March 1988 Additional Ground Water Sampling Results

1. General

ENVIRON conducted an additional ground water sampling round in March 1988 in order to examine the occurrence and concentrations of priority pollutant metals from both unfiltered and filtered samples, and to delineate further the extent of volatile organics and total petroleum hydrocarbons in the ground water. The samples were collected in accordance with the methods and procedures previously outlined in Section II. Additionally, the filtering of ground water samples for priority pollutant metal analyses was accomplished utilizing a vacuum-pumped 0.45 micron cellulose nitrate filtering apparatus. The schedule of analytical parameters for each tested monitoring well is provided in Table IV-1. In addition to samples from each of the nineteen shallow wells, samples from Newark Bay, Plum Creek and each of the deep wells that had previously been found to contain a tested parameter above informal ECRA cleanup guidelines, were analyzed for one or more of the aforementioned parameters. Newark Bay and Plum Creek were particularly targeted for sampling because of their influence on ground water flow and their respective potential for transporting constituents to the site. The analytical results are summarized in Appendix G (Table G-4) and the Tier II data package is provided in Volume IV.

This sampling round was primarily triggered by the presence of fine sediment in some monitoring wells and the occurrence of PPMs at concentrations greater than their possible solubility given the known pH range of ground water found on-site. The laboratory method for priority pollutant metal analysis requires acid spiking of the sample in the field. Any metals associated with the sediment would have an increased solubility in the unfiltered acidified water than in the non-acidified water. For this reason, some of the resultant data obtained during implementation of the Phase II Sampling Plan did not accurately represent the dissolved metal content in the ground water.

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Table IV-1: Schedule of Analytical Parameters for March 1988 Additional Ground Water Sampling Round

Sampling Location	ANALYSES			
	VOC+15	TPHC	PPMs Filtered	PPMs Unfiltered
MW01		X	X	X
MW02		X	X	X
MW03			X	X
MW04			X	X
MW05			X	X
MW06	X		X	X
MW07	X		X	X
MW08			X	X
MW09			X	X
MW10	X		X	X
MW11	X		X	X
MW12			X	X
MW13	X		X	X
MW14	X		X	X
MW15	X		X	X
MW16			X	X
MW17			X	X
MW18			X	X
MW19			X	X
MW22	X		X	X
MW26		X		
Plum Creek		X	X	X
Newark Bay			X	X

AKH000702

945990503

2. Analytical Results

Unfiltered ground water samples from fourteen shallow wells contained between one and eight PPMs above informal ECRA cleanup guidelines. These results are consistent with those obtained during the Phase II Sampling Plan. With the exception of lead in MW16, only selenium was detected at concentrations above informal ECRA cleanup guidelines in the filtered ground water samples.* Selenium was detected in most of the tidally influenced wells (MW4, MW7, MW8, MW17, MW19, MW22) and Newark Bay. The concentrations of selenium are highest in Newark Bay, indicating that the bay is the most likely source of this metal. Only one upgradient well (MW12), located within the radius of influence of the underground flume, was found to contain selenium slightly above the informal ECRA cleanup guideline. The occurrence of selenium in this well may be the result of selenium migrating through the flume from Newark Bay during high tides. Priority pollutant metals were not detected in Plum Creek.

Petroleum hydrocarbons were detected at the informal ECRA cleanup guideline (1,000 ppb) in background monitoring well 1.

* Selenium has not previously been detected in the ground water at this site. The detection of selenium during this sampling round is apparently the result of new equipment in the laboratory which has greater sensitivity, particularly to selenium, than the instrument(s) used during other rounds of analyses.

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Volatile organics were detected in samples from wells MW7, MW10, MW11 and MW13. VOCs had been detected in these wells above the informal ECRA cleanup guideline during Phase 1 and/or Phase 2.

AKH000704

945990505

V. DISCUSSION

A. Soils

1. General

Analytical results of 42 Phase II soil samples indicate the presence of PPMs and TPHCs at concentrations in excess of informal ECRA cleanup guidelines in many areas of the site. The pattern of contamination is discussed below.

2. Priority Pollutant Metals (PPMs)

The analytical results of the PPM analyses from the uppermost soil sample in each boring are illustrated on Plate 2 (Appendix I). The types and concentrations of PPMs varied considerably throughout the site, although lead, zinc, copper and mercury appear to be the most prevalent. The most significant levels of PPMs were detected in soil samples collected from the central and eastern portions of the site (MW16, MW18, MW26 and boring 2104).

Lead and zinc are the most common PPMs detected in the uppermost soils, exceeding informal ECRA cleanup guidelines in over 50 percent of the samples. The range of lead and zinc concentrations above informal ECRA cleanup guidelines varied between 262 to 1620 ppm and 352 to 2670 ppm, respectively. Antimony, arsenic, chromium and silver were found at levels in excess of informal ECRA cleanup guidelines in isolated areas.

PPMs are generally not found above informal ECRA cleanup guidelines in the uppermost soils of the western and northern portions of the site. Soil samples from AEC 3, however, did contain levels of chromium and/or mercury slightly above informal ECRA cleanup guidelines.

The presence of PPMs does not appear to be the result of industrial activities at the site. None of the PPMs is known to have been used in any process during the operating history of the site, suggesting that their occurrence in the soils is most likely related to the fill material. Additionally, the variability of PPMs suggests that the fill material present beneath the site is extremely heterogeneous.

Plate 3 (Appendix I) illustrates the levels of PPMs above informal ECRA cleanup guidelines in deeper soil samples collected just above the water table. As previously mentioned, only 10 soil samples were collected from this interval, due to a very high water table and poor split spoon recovery. The analytical results again indicate the highest concentrations of metals in the central and eastern portions of the site. Concentrations of metals from these "at depth" soil samples are generally consistent with those observed in the surficial samples. It should be noted, however, that "at-depth" samples from boring locations MW15, MW17 and 002 showed significantly greater metal concentrations and numbers of metal species than the surficial samples taken from the same locations.

This supports the conclusion that the presence of PPMs is most likely associated with the fill material. If the metals had been introduced into the soil by site activities, the higher concentrations would be expected in the near surface soil samples.

PPMs were typically not detected in deeper soil samples taken in the western and northern portions of the site. Cadmium, however, was detected at a level in excess of the informal ECRA cleanup guideline in the "at-depth" sample collected from boring 403, located along the northern railroad tracks.

3. Total Petroleum Hydrocarbons (TPHCs)

The nature of TPHCs in Phase II soil samples was determined by two distinct analytical methods. The gravimetric method, based on the weight of the various hydrocarbon fractions, was used initially. This method is most accurate for heavier and longer chained hydrocarbons, because lighter fractions may volatilize during the analytical procedure. The analytical data generated included the determination of the aliphatic (F_1), aromatic (F_2) and fatty acid (FA) fractions.

The gas chromatography/flame ionization detector (GC/FID) method (which is most accurate for the lighter and shorter chained hydrocarbons) was also utilized. This method detects only lighter and shorter chained hydrocarbons and not the heaviest hydrocarbons.

The combination of the two methods provided a balance and range of values (upper and lower limits) of the petroleum hydrocarbons found in the samples. It should be noted that the aliphatic plus the aromatic fractions provide the total petroleum hydrocarbon fraction found in the samples. The fatty acid fraction is the non-petroleum-based hydrocarbon material.

Plate 4 (Appendix I) illustrates the concentrations of petroleum hydrocarbons in excess of informal ECRA cleanup guidelines within the upper two feet of soil throughout the site. The values provided represent the highest concentrations detected by either analytical method. The average values detected by the gravimetric and GC/FID methods are 2,140 ppm and 1,350 ppm, respectively. The range is from non-detect to 12,000 ppm. Also illustrated on Plate 4 are qualitative descriptions of the petroleum hydrocarbon fractions and the concentrations of fatty acids or non-petroleum-based hydrocarbons for each sampling location.

Although the Phase II "fingerprinting" results indicate that a significant portion of the hydrocarbons detected in soil samples are non-petroleum-based oils, levels of petroleum-based hydrocarbons in excess of informal ECRA cleanup guidelines still remain in a number of areas on the site. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as paint thinner, fuel oils, lubricating oils, gasoline, kerosene, coal tar and polynuclear aromatic hydrocarbons (PAHs). The fatty acid or non-petroleum-based fractions were typically identified as either soybean oil or linseed oil. In some instances, the type(s) of oil were similar to those used on the site. In other instances there was no correlation between known site activities and the observed-contamination, suggesting that petroleum hydrocarbons were present as part of the fill used on-site or released from an unidentified on-site source. A discussion of the type(s) of oil found within the tested AECs and possible sources is provided below.

The highest levels of petroleum hydrocarbons (12,000 ppm) were detected in the soil sample (boring 2104) located within AEC 21, a former aboveground storage tank area which was unpaved at the time of use. The hydrocarbon fraction consisted of a mixture of paint thinner, gasoline and a fuel or lubricating oil. The former contents of these tanks are unknown, and the tanks were removed in the early 1960s.

Similar values of petroleum hydrocarbons (11,000 ppm) were detected in the soil sample collected from boring MW12. The petroleum product at this location was qualitatively identified as lubricating oil and may be the result of past spills from Building 25. Prior to 1962, the maintenance shop was housed in Building 25, and lubricating oils were routinely used at this location.

Significant levels of total petroleum hydrocarbons were detected in Phase I samples collected from AECs 3 and 4. Although results of the "fingerprinting" analyses conducted on Phase II soil samples obtained from these AECs indicate that a substantial portion of the hydrocarbons are non-petroleum-based products such as linseed oil and soybean oil, levels of petroleum hydrocarbons above informal ECRA cleanup guidelines still remain. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as paint thinner, coal tar and kerosene. Resins are considered to be the most likely source, because they contain paint thinner and are routinely loaded into Building 32, which is located immediately adjacent to AEC 3. The coal tar detected in this and other samples along the railroad tracks may be the result of the leaching of coal tar from the railroad ties, which are typically coated with coal tar or creosote. The presence of kerosene may be due to the possible use of this fuel for locomotives during the winter months, because kerosene is less likely to congeal. Gasoline and fuel oil were detected in samples from AEC 4. The fuel oil may be due to leakage associated with train engines using diesel fuel. The source of the gasoline is not known.

AEC 10 is an area where drummed raw materials were stored. Polynuclear aromatic hydrocarbons were qualitatively identified as the petroleum product at this location, though there is no evidence to suggest that previous activities associated with petroleum hydrocarbons had taken place in this area.

The soil sample from AEC 13 had significant quantities of non-petroleum hydrocarbons (16,000 ppm) and petroleum hydrocarbons (1,080 ppm), which were qualitatively identified as fuel oil #6. No fuel oil was known to have been stored in this area. The occurrence of the non-petroleum hydrocarbons is most likely the result of vegetable oil storage in this area while the site was unpaved.

Gasoline, fuel oil/lubricating oil, and paint thinner petroleum products were qualitatively identified as the soil contaminants in AEC 14. The source of the paint thinner is most likely the 1285 Premix which was stored in Tanks 309 and 315 (Plate 4). No known sources exist in this area for the gasoline or fuel oil/lubricating oil products.

Petroleum products in the fuel oil and lubricating oil range and paint thinner were detected in the soil sample collected from AEC 16. The source of the paint thinner may be related to the possible leakage of 1285 Premix from drums that were previously stored in the area while it was unpaved.

Three soil samples were collected and "fingerprinted" from AEC 17. Lubricating oil, fuel oil, polynuclear aromatic hydrocarbons and coal tar were detected among the samples. A former coal pile in the area in which MW10 and MW24 now exist may have been the source for the polynuclear aromatic hydrocarbons and the coal tar. The lubricating oil from the boring 1704 sample may be the result of oils used for railroad cars along the adjacent tracks. Fuel oil and lubricating oil were qualitatively identified in boring 1705. There are no known on-site sources for these petroleum products in this area. It should be noted, however, that this portion of the site is adjacent to an industrial establishment that utilizes and stores petroleum products.

AEC 19 surrounds tank 300, which at different times in the past contained waste resin 1285 Premix and vegetable oils. The vegetable oils are the most likely source for the very high levels of non-petroleum-based hydrocarbons detected. The 1285 Premix would account for the paint thinner detected in the petroleum fractions.

AEC 23 is an area used for loading and unloading trucks of products which contain paint thinner and waste resin solutions. The trucks themselves may be the source of the fuel oil detected. Polynuclear aromatic hydrocarbons were also detected in this area, although a potential source is not apparent.

Significant quantities of vegetable oils were transferred in the vicinity of AEC 25 and would potentially account for the concentration (16,000 ppm) of linseed oil detected in this sample. Coal tar was also detected and may be related to leaching from the adjacent railroad ties. The occurrence of fuel oil/lubricating oil in this area may be attributed to their use in and on the railroad cars. Similar contamination was found near MW14, which is located immediately adjacent to AEC 25 along the same set of railroad tracks. The polynuclear aromatic hydrocarbons detected in this sample may be the result of coal ash that was previously stored less than 50 feet away. Typical railroad track contamination of fuel and lubricating oils was reported in the area of MW13, also located along the tracks approximately 100 feet west of AEC 25.

The soil sample collected from MW15 contained petroleum hydrocarbons that were qualitatively identified as polynuclear aromatic hydrocarbons and fuel and lubricating oils. The presence of the polynuclear aromatic hydrocarbon contamination could be attributed to the two nearby areas in which coal and ash were piled. However, there are no known sources of fuel or lubricating oils in this area.

The soil sample collected from MW16 is also near a former coal storage area, which could a source for the polynuclear aromatic hydrocarbons. No known sources exist for the fuel oil/lubricating oil detected in the sample from this area.

The soil samples collected from MW17 and MW26 contained relatively low levels of fuel oil/lubricating oil. There is no known potential source of these oils in this area and their presence may be attributable to background levels in the fill material.

The soil sample collected from boring MW18 contains relatively low levels of fuel oil/lubricating oil and polynuclear aromatic hydrocarbons, both of which have no evident source. The fill material in this area was reported to contain significant ash content. Ash is a possible source of polynuclear aromatic hydrocarbon contamination.

B. Shallow Ground Water

1. General

Analytical results of ground water samples from shallow fill unit monitoring wells indicate the presence of PPMs in excess of informal ECRA cleanup guidelines. Additionally, PHCs and VOCs were detected in localized areas. The pattern of contamination is discussed below.

2. Priority Pollutant Metals (PPMs)

The analytical results of PPM analyses of Phase II ground water samples are illustrated on Plate 5 (Appendix I). Lead was the predominant PPM observed in ground water samples throughout the site in concentrations ranging from 60 to 9450 ppb. Other PPMs, including cadmium, chromium and/or arsenic, copper, mercury and zinc, were detected at levels in excess of informal ECRA cleanup guidelines in ground water samples from MW4, MW16, MW17 and MW19.

The analytical results obtained from the March 1988 additional ground water sampling round (Plate 6 (Appendix I)) indicate, however, that the presence of lead in the shallow ground water beneath the site and the occurrence of additional metal species in monitoring wells MW4, MW16, MW17, and MW19 do not represent the dissolved metal contents but are the result of metals associated with fine particulate sediments in the shallow ground water. Because the laboratory method for priority pollutant metal analysis requires acid spiking of the sample in the field, metals associated with the sediment exhibited an increased solubility in the unfiltered acidified water.

Results of the filtered ground water samples indicate that, with the exception of lead detected in MW16, the only dissolved metal content in the ground water is selenium. The concentration of selenium in Newark Bay is similar to the levels reported for shallow ground water on-site, indicating that the source of selenium is probably Newark Bay especially given the extent of tidal impact on the site.

3. Total Petroleum Hydrocarbons (TPHCs)

All ground water samples collected as part of the Phase II Sampling Plan were analyzed for TPHCs. Analytical results at levels above informal ECRA cleanup guidelines are illustrated on Plate 5 (Appendix I). In the shallow aquifer, TPHCs were found above the 1,000 ppb informal ECRA cleanup guideline in two background wells in the very western portion of the site. These wells, MW01 and MW02, are located in the northwest and southwest corners of the site, respectively. Because general ground water flow direction is west to east, the locations of the wells indicate that the TPHC contamination is from an off-site source.

MW01, MW02 and other existing monitoring wells were previously tested for TPHCs during implementation of the Phase I Sampling Plan. At that time, only MW01 exceeded informal ECRA cleanup guidelines for TPHCs. The concentration of TPHCs measured in MW01 during Phase II is significantly lower than that obtained during Phase I. Additionally, the results from the additional ground water sampling (Plate 6 (Appendix I)) show TPHCs at the informal ECRA cleanup guideline (1,000 ppb) in MW01. TPHCs were not detected in other wells during this sampling round.

4. Volatile Organic Compounds (VOCs)

All ground water samples collected during the Phase II Sampling Plan were tested for VOCs plus a forward library search for the next 15 constituents present in the highest concentrations (VOC+15). The analytical results above informal ECRA cleanup guidelines are shown on Plate 5 (Appendix I). Only two shallow wells, MW10 and MW13, contain volatiles in excess of informal ECRA cleanup guidelines. MW10 contained the highest concentrations of VOCs when sampled during Phase I. Though the concentrations detected in MW10 during the Phase II program are less, they are still the highest on-site. Phase II well MW13 was the only other to contain concentrations of total VOCs in excess of informal ECRA cleanup guidelines.

These wells, though close in proximity, do not necessarily share the same source for volatile contamination. This is evidenced by the fact that MW10 contains only toluene and MW13 contains only ethylbenzene. The source for the ethylbenzene in MW13 is likely the soil in AEC 12, which was found during Phase I to contain the highest concentrations of ethylbenzene on site. The source of toluene observed in MW10 is likely to be the soil in AEC 17 in which the highest concentrations of toluene were detected during Phase I.

Results of the March 1988 additional sampling (Plate 6 (Appendix I)) confirmed the existence of VOCs in monitoring wells MW10 and MW13. Levels of VOCs were also detected in wells MW7 and MW11, located in the northern portion of the site. Similar levels of VOCs were reported for MW7 and MW11 during the execution of the Phase I

Sampling Plan. The VOCs detected in the ground water in this area could have come from AEC 26, a large tank farm containing drains that previously discharged directly to the ground. These drains have since been plugged. However, given the sporadic occurrence of VOCs in these wells and the steep hydraulic gradient observed in this area, the presence of VOCs may be the result of contaminant migration from an off-site source.

5. Cyanide

All Phase II ground water samples were analyzed for cyanide. Cyanide was below method detection limits in most samples and none of the samples contained levels in excess of informal ECRA cleanup guidelines.

C. Deep Aquifer Summary

All Phase II ground water samples collected from the deep aquifer were analyzed for PPMs, TPHCs, VOCs, and cyanide. No samples were found to contain cyanide or VOCs. Monitoring well 26, however, did contain TPHCs at a concentration (1,100 ppb) slightly exceeding the informal ECRA cleanup guideline (Plate 5 (Appendix I)). One possible source of this contamination is Newark Bay, given the proximity of this well to the bay and the hydrologic connection between the deep aquifer and the bay. A low level of lead (69 ppb) was also detected in the Phase II ground water sample collected from deep well MW22, although the occurrence of this metal is likely to be the result of field acidification. PPMs were not detected above informal ECRA cleanup guidelines in other deep well samples.

A level of selenium slightly exceeding ECRA cleanup guidelines was detected in MW22 during the March 1988 additional sampling (Plate 6 (Appendix I)). Similar concentrations were detected in Newark Bay, indicating that the bay is the likely source of selenium given the hydrologic connection between the deep aquifer and the bay.

VI. CONCLUSIONS

A. General

The results of this sampling program helped to define the lateral and vertical extent, and type, of contamination present at the site. Additional characterization to define the areas and/or environmental media that potentially require remediation under ECRA is not required. The findings indicate that there is some contamination of soils and ground water at the site. These findings are discussed below in light of the probable sources of contamination.

B. Contamination Related to On-Site Activities

VOCs, particularly ethylbenzene and toluene, and petroleum hydrocarbons appear to have been introduced into the surficial soils of the fill unit by operations and activities that took place at the facility. The occurrence and relative concentrations of these compounds are generally consistent with known and possible uses within certain AECs.

Ethylbenzene and toluene are known to have been used at this facility. The only areas in which these two compounds were detected are areas in which it was suspected that they might be found due to past practices at the site.

Results of the Phase II sampling program indicate that a significant quantity of the TPHCs on the site are non-hazardous fish and vegetable oils. The data also indicate that petroleum-based hydrocarbons, such as fuel oils, lubricating oils, and gasoline, remain within most of the tested AECs. In many instances, the occurrence of both non-hazardous fish and vegetable oils and petroleum-based hydrocarbons can be related to past activities and operations of the facility.

C. Contamination Related to Materials of the Fill Unit

The analytical data indicate the occurrence of PPMs in soils from designated background sampling locations and from within the central and eastern portions of the site. The variability of the PPM concentrations throughout the site attests to the heterogeneity of the fill material. Additionally, the widespread occurrence of PPMs within the central and eastern portions of the site is most likely due to the emplacement of distinct fill material.

Because none of the detected PPMs has been used at the facility at any time during the operating history of the site, their presence is believed to be related to the underlying fill materials. Furthermore, the soil samples in which the highest concentrations of the metals were found were generally those from the deeper soil sample collected immediately above the water table. If the metals had been introduced into the soils by the practices at the site, the higher concentrations would be expected in the surficial samples.

In addition, some of the TPHC contamination, as well as detected base neutral concentrations in certain areas of the site, were found in unexpected locations. The presence of these compounds in areas of the site deemed to be unaffected by operations that could have potentially contaminated the soils with these constituents is most likely related to normal background levels of these compounds within the fill material. For example, significant concentrations of TPHCs were detected in soil samples collected from background monitoring well locations. The range of apparent background TPHCs varies considerably, however, even within a short distance. Base neutral organics were also detected in several unexpected locations. The data suggest that their presence may be related to background petroleum hydrocarbons.

D. Interaction Between Fill Unit and Shallow Aquifer

Despite the presence of VOCs and petroleum hydrocarbons within the shallow soils of the fill unit, little contamination has been detected in the shallow ground water. The pavement which covers the majority of the site is preventing the infiltration of rainwater from the surface, thus inhibiting the migration of contaminants from the soil matrix into the ground water.

Analytical results of ground water samples collected from site monitoring wells indicate that the TPHCs detected in the shallow aquifer were found only in the two upgradient background wells. Because these areas of the site have not been used for site operations, and given the proximity of these wells to other industrial establishments, the occurrence of petroleum hydrocarbons is believed to be caused by an off-site source.

Volatile organic compounds at levels in excess of the informal ECRA cleanup guidelines were detected in only four of 19 shallow wells (MW7, MW10, MW11, MW13). Toluene and/or ethylbenzene were generally the detected constituents of concern, although low levels of benzene were occasionally reported. The concentrations of toluene are typically greater than ethylbenzene, which is consistent with the partition coefficients for these two compounds. Except for MW10, the concentrations of total VOCs in the ground water are relatively low. Based on the results of soil samples collected from MW10 and MW13, it appears that the contamination in these two monitoring wells is related to localized soil contamination. VOCs were detected in MW7 and MW11 at levels exceeding ECRA informal guidelines during the March 1988 additional sampling. This contamination could be due to activities in AEC 26 or to migration from off-site sources of contamination.

Results of the Phase II Sampling Plan indicate that the underground flume serves as the discharge point for much of the shallow ground water, although a component of flow is toward the area of the site where the on-site storm sewer conduit penetrates the breakwall adjacent to Newark Bay. As previously stated, levels of VOCs in the shallow ground water were detected in localized areas of the site and were not detected in Phase II wells installed in downgradient portions of the site. Although full plume definition is currently unknown, it is assumed that the underground flume is the likely discharge point for most constituents that have entered the ground water.

E. Deep Aquifer

The analytical results of ground water samples collected from wells monitoring the deeper aquifer indicate that the deep ground water beneath the site has not been affected by site activities. No contamination has been detected in samples from either of the two upgradient background wells. Trace levels of VOCs were reported in one downgradient deep well (MW22) during the Phase I sampling activities. The presence of VOCs, however, was not detected during subsequent sampling rounds. During Phase II sampling, a low level of lead was detected in MW22 and a low level of TPHC was detected in MW26. The lead level is believed to be due to field acidification and the TPHC contamination probably results from the tidal influence of Newark Bay. A low level of selenium was also detected in the ground water sample from MW22 during implementation of the March 1988 additional sampling. Similar levels of this metal were detected in a sample from Newark Bay. This suggests that the bay is the most likely source for selenium, especially given that the deep aquifer is tidally influenced.

VII. REMEDIATION STRATEGY/PART I CLEANUP PLAN

A. Introduction

As presented in preceding sections of this report, several classes of constituents are present in soil and ground water at concentrations exceeding informal ECRA cleanup guidelines. These guidelines are used by the NJDEP as "action levels" to determine where cleanup may be necessary at ECRA sites. However, comparisons of analytical results to the informal ECRA cleanup guidelines do not alone establish whether or not soil or ground water cleanup is actually necessary. Under ECRA, such a decision must take into account the need to protect public health and the environment, as well as other factors, including the origin of the contaminants and surrounding ambient conditions. In fact, the ECRA statute (see N.J.S.A. 13:1K-10.a) and regulations specifically address the need to establish cleanup standards that consider both protection of public health and the environment and other relevant factors:

> The Department shall review, approve or disapprove negative declarations and cleanup plans on a case-by-case basis for soil, ground water and surface water quality necessary for cleanup of an industrial establishment, including buildings and equipment, <u>to ensure that the potential for harm to public health and the environment is minimized to the maximum extent practicable, taking</u>

> into consideration the location of the industrial establishment, surrounding ambient conditions, and other relevant factors.
> (N.J.A.C. 7:26 B-11.1; emphasis added.)

Consistent with the ECRA regulations, in determining if cleanup is necessary, ENVIRON has considered several relevant factors, including the nature of contamination attributable to site-specific background levels within the fill unit, former site activities and operations, off-site sources of contamination, and potential health and environmental risks of constituents found at the Spencer Kellogg facility. Results of this evaluation indicate that, at a minimum, the continued operation of the facility with the existing levels of constituents in soil and ground water does not threaten public health or the environment and therefore extensive remediation of the site is not warranted. However, because VOCs have leached into the site's ground water and because VOCs in the soil are largely the result of past site operations, Textron proposes to evaluate the use of in situ soil remediation for reducing the level of VOCs in the soil. (Although Textron is not proposing a remediation program specifically to address TPHCs, Textron notes that the in situ biodegradation program it is proposing to evaluate to address VOCs should also be quite effective in dealing with the non-petroleum based hydrocarbons and the petroleum hydrocarbons at the site.)

Textron will implement this remediation program if it can be applied in a cost-effective manner without disrupting the ongoing activities at this industrial site. Should in situ remediation prove impracticable, Textron will propose a different remediation approach or demonstrate more fully why extensive remediation is not warranted. To be considered, alternative remedial approaches would also have to be cost-effective and non-disruptive of ongoing site activities.

Presented below is a more detailed explanation of the proposed cleanup approach and a description of the phased approach ENVIRON proposes for studying the feasibility of _in situ_ bioremediation of contaminated soil at the Spencer Kellogg site.

B. Evaluating the Need for Cleanup

1. General

As noted above, a number of relevant factors were considered in determining the need for remediation of soil and ground water at the site. The specific evaluative criteria included: 1) the nature of any contamination resulting from activities and operations when the facility was owned by Textron; 2) the nature and concentrations of chemical constituents associated with the fill materials; 3) the nature of contamination caused by off-site sources; 4) surrounding ambient conditions; and 5) whether existing levels of constituents pose an unacceptable health and environmental risk. Presented below is a discussion of these criteria as they apply to constituents detected in soil and ground water.

2. Soil

An evaluation of soils data indicates that PPMs, TPHCs, and VOCs are present in broad areas of the site at levels above the informal ECRA cleanup guidelines. BNs or PAHs were also detected at a few sampling locations.

The presence of PPMs in the soil is believed to have resulted from on-site fill materials rather than past industrial activities because none of the metals detected is known to have been used during the operating history of the site. In addition, the variability of metal concentrations and noted increases of metal concentrations with depth at several sampling locations are indicative of heterogeneous fill material rather than the effect of site operations. The occurrence of PPMs is virtually limited to the central and eastern portions of the site, areas where distinct fill material was apparently emplaced. For these reasons, Textron believes that any cleanup activity should not include PPMs in soils.

Like PPMs, TPHCs appear to be present in the fill material. However, unlike PPMs, the past use and handling of raw materials, products and wastes appears to have contributed to the levels of TPHCs found in soil. In a number of cases, a significant portion of what was originally reported as TPHC contamination is attributable to the presence of non-hazardous fish and vegetable oils. These materials do not warrant remediation because they are non-hazardous and are not ECRA-listed hazardous substances.

Despite the presence of TPHCs in soils, Textron does not believe remediation of TPHCs is necessary.* This conclusion is largely based on the observation that TPHCs are not leaching from the fill material into the shallow ground water. Concentrations of TPHCs in excess of informal ECRA cleanup guidelines were detected in only two monitoring wells, both upgradient background wells. The presence of TPHCs in these wells is related to off-site sources because these wells are located in areas unaffected by past site activities and immediately adjacent to upgradient industrial establishments known to use or handle petroleum hydrocarbons.

Total BNs or PAHs were detected at concentrations exceeding the informal ECRA cleanup guidelines in a few soil samples. The concentration of each of the individual compounds was relatively low. The source of these constituents at some sampling locations may be related to the presence of TPHCs, although the occurrence of total BNs or PAHs in other areas, where no apparent source exists, suggests that they are associated with the fill material. As with TPHCs, Textron does not believe that remediation is necessary because neither BNs nor PAHs have been detected in the ground water.**

* Although Textron is not proposing a remediation program specifically to address TPHCs, Textron notes that the <u>in situ</u> biodegradation program it is proposing to evaluate to address VOCs should also be effective in dealing with the non-petroleum based hydrocarbons and the petroleum hydrocarbons at the site.

** Although Textron is not proposing a remediation program specifically to address BNs and PAHs, Textron notes that the <u>in situ</u> biodegradation program it is proposing to evaluate to address VOCs should also be effective in dealing with the BNs and the PAHs at the site.

VOCs, particularly ethylbenzene and toluene, appear to have been introduced into the soil of the fill unit in certain areas of the site by historical industrial operations and activities at the facility. In general, the presence and relative concentrations of these compounds are consistent with known and suspected uses in certain AECs. VOCs have been detected in the shallow ground water in localized areas of the site, although the level of these constituents are typically within the parts per billion (ppb) range. These results suggest that the shallow ground water has been affected by soils contaminated with VOCs. However, as discussed below, modeling of the shallow ground water indicates that current VOC levels in the shallow ground water pose no environmental or public health risk at the nearest receptor boundary (Newark Bay).

3. Shallow Ground Water

As described above, the presence of TPHCs, PPMs and BNs in shallow soils has had little or no impact on the quality of shallow ground water. TPHCs at levels slightly above informal ECRA cleanup guidelines are present in the upgradient wells and are attributable to off-site sources. With one exception, the only dissolved PPM detected at levels above the informal ECRA cleanup guideline is selenium, the source of which is apparently Newark Bay. BNs have never been detected in ground water. VOCs detected in the shallow ground water are for the most part likely related to contaminated on-site soils, but the impact appears to be limited in areal extent.

In determining the need for additional investigation and/or shallow ground water remediation, mathematical analyses were performed to evaluate the potential migration of VOC contamination in the shallow aquifer. The analyses were based on hydrogeologic and analytical data collected from November 1986 to March 1988. Utilizing an analytical contaminant transport model, toluene concentrations in the ground water at downgradient discharge locations were simulated. Toluene was selected for the modeling because this VOC compound was detected in the highest concentrations observed at the site. The results indicate that the toluene concentration at the nearest receptor boundary (Newark Bay) would be insignificant and pose no risk to public health or the environment. Therefore, ENVIRON and Textron believe that additional characterization or remediation of the shallow ground water is not required. A description of the analytical model, assumptions used, and calculations are provided in Appendix H.

In addition, if ground water remediation were demonstrated to be necessary, traditional pump and treat methods would be inappropriate due to off-site sources of contamination and the extensive tidal influence of Newark Bay. Pumping the ground water would only create a sink, drawing additional constituents to the site. Moreover, the source of VOCs affecting the shallow ground water should be extensively reduced if the <u>in situ</u> soil treatment methodology that will be evaluated proves to be a cost-effective method of VOC treatment.

4. Deep Aquifer

As previously outlined in Section VI, the analytical results of samples from wells monitoring the deep aquifer indicate that the deeper transmissive zone is not contaminated. Lead and VOCs were detected in MW22 but this contamination was noted in only one of three sampling rounds. A number of factors could have caused this incidental detection of lead and VOCs (field acidification of samples, tidal influence of Newark Bay, contamination during well construction, etc.), but none are linked to past industrial operations at the site. Therefore, no additional investigation or remedial action with respect to the deep aquifer is required.

C. Proposed Potential Cleanup Methodology

1. General

As noted above, ENVIRON and Textron believe that continued operation of the Spencer Kellogg facility with the levels of constituents found in soil and shallow ground water does not threaten public health or the environment. Moreover, a portion of the soil contamination, particularly the PPMs, is attributable to the nature of the fill material. Similarly, TPHCs and dissolved PPMs detected in shallow ground water come from off-site industrial activities or Newark Bay. For these reasons, Textron does not believe that extensive remediation of the site is necessary.

Textron does recognize, however, that some of the soil contamination, particularly the VOCs, can be linked to historical on-site industrial activities. In addition, the ground water data show that the VOCs are leaching into the shallow ground water in a limited portion of the site. Accordingly, although ground water fate and transport modeling indicates that the VOCs in the shallow ground water pose no threat to public health or the environment at the nearest receptor boundary (Newark Bay), Textron believes that it is appropriate to evaluate the technical feasibility and cost-effectiveness of an *in situ* soil remediation program for VOCs. Although the primary goal of this program would be to address the VOC soil contamination, an additional benefit would include a reduction in the VOCs entering the shallow ground water and probable reductions of TPHCs, non-hazardous fish and vegetable oils, and BNs in the soil. For these reasons, Textron proposes to explore the technical feasibility and cost-effectiveness of a soil remediation program for VOCs utilizing *in situ* treatment.

2. Screening and Evaluation of In Situ Biodegradation

This section describes the approach ENVIRON proposes for evaluating the technical feasibility and effectiveness of *in situ* biodegradation of contaminated soils. *In situ* biodegradation involves the injection of nutrients and oxygen into the subsurface to stimulate the growth of naturally occurring microorganisms. Under aerobic conditions, the microorganisms can utilize hydrocarbons as an energy source, metabolizing them to carbon dioxide and water.

The treatment goal is the reduction of VOCs to the maximum extent possible in a cost-effective manner without disrupting activities at the site. Although significant reductions are anticipated, the exact reductions achievable are currently unknown because the potential treatment is innovative and depends on site-specific factors. These factors include the type of indigenous bacteria present in site soils, the rate of biodegradability, moisture content of the soil, soil texture, pH and nutrient availability.

A phased approach will be necessary for studying this bioremediation program. During Phase I, parameters critical to the proper design and successful implementation of a remedial program, including the physical and chemical properties of the soil must be determined. These factors not only influence the broad remedial strategy, but also the selection of specific treatment, methods and levels of engineering parameters (e.g., nutrient dose and frequency of application) required. Accordingly, Phase I will involve initial testing at a bench-scale level with soils procured from the site. Phase II will consist of a field demonstration study to determine the most effective method for moving nutrients and/or oxygen through the soil. Phase III will be a pilot-scale test and Phase IV, if Phases I through III demonstrate that in situ bioremediation is a technically feasible and cost-effective remedy for VOC soil contamination at this site, will set forth the final remedial design and schedule for Part II Cleanup Plan implementation.

This phased approach will permit Textron the flexibility necessary to evaluate after each step the technical feasibility and cost-effectiveness of the in situ treatment program. In this way, if after any phase it becomes apparent that in situ treatment is not a practical remediation technique for this site, Textron will be able to change course. Textron would then propose a different remediation approach consistent with the goals of cost-effectiveness and minimal site disruption or demonstrate more fully why extensive remediation is not warranted for protecting public health or the environment at the Spencer Kellogg site.

a) Phase I: Bench-Scale Treatability Study

ENVIRON will select a subcontractor with experience in remediating sites similar to the Spencer Kellogg site to conduct a bench-scale treatability study of in situ biodegradation. Under ENVIRON's supervision, the subcontractor will review the existing site data and collect representative soil samples to evaluate on-site treatment. The major tasks associated with the laboratory testing include:

- Screening for indigenous bacterial populations;
- Screening for metal content to assess potential bioinhibitory effects of metals; and

- Testing degradation rates utilizing sterile samples, samples with bacterial populations, and distinct nutrient blends.

Results of the bench-scale tests will be used to evaluate the practicality of implementing this technology.

b) Phase II: Field Demonstration Study

If the results of Phase I are encouraging and *in situ* biodegradation appears to offer a feasible and cost-effective method of remediation, ENVIRON will conduct a field demonstration study. This study will be conducted subsequent to the laboratory work to determine the method of nutrient introduction and dispersement. Evaluation of nutrient transport techniques are critical to determine the practicality of this *in situ* remedial method. The specific types of nutrient introduction and dispersement methodologies that may be field tested include the use of:

- Individual wells;
- Excavating strips and utilizing perforated pipes (e.g., trenching); and
- Drilling holes through the pavement.

c) Phase III: Pilot-Scale Testing

If the results of the Phase I and Phase II studies indicate that *in situ* biodegradation may be practical, a pilot-scale test will be designed to demonstrate the effectiveness of the most appropriate treatment solution and dispersion methodology. Information obtained during this phase will be critical for optimizing the final remediation design (sizing, chemical requirements, time required) and will be necessary to develop an accurate cost estimate for a final cleanup plan as required under ECRA.

d) Phase IV: Design and Implementation of the Selected Remediation Technology

If the results of the first three phases indicate that *in situ* biodegradation will be a technically feasible and cost-effective method of remediating the site without causing disruption of current site operations, a recommended Part II Cleanup Plan will be developed and submitted to the NJDEP for final approval. The final plan will describe the remedial design selected for the site, set forth an implementation schedule and propose the cleanup levels to be achieved based on the results of Phases I, II, and III. As required under ECRA, a schedule of activities for completion of the cleanup, and an accurate and detailed cost estimate will be provided as part of the final cleanup plan. In addition, the final cleanup plan will provide details of soil (and possible ground water) monitoring to the extent deemed necessary.

e) Schedule

The Phase I laboratory studies are estimated to take two to three months to complete from the date of NJDEP approval of this phased cleanup proposal. The field demonstration tests of Phase II will require an additional two to three months to complete. The pilot-scale test of Phase III will likely require another six to eight months to complete.

AKH000738

945990539

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX A

Informal ECRA Cleanup Guidelines in Soil and Ground Water

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Informal ECRA Cleanup Guidelines in Soil and Ground Water

Parameter	Soil	Ground Water
Total Petroleum Hydrocarbons (TPHCs)	100 ppm	1,000 ppb
Priority Pollutants:		
Acid Extractable Organics (AEs)	Case-by-case	50 ppb
Base/Neutral Extractable Organics (BNs)	10 ppm	50 ppb
Pesticides	Case-by-case	Case-by-case
Polychlorinated Biphenyls (PCBs)	1-5 ppm	0.001 ppb
Volatile Organics (VOCs)	1 ppm	10 ppb
Phenols	Case-by-case	3,500 ppb
Cyanide (CN)	12 ppm	200 ppb
Priority Pollutant Metals (PPMs)		
Antimony (Sb)	2 ppm	--
Arsenic (As)	20 ppm	50 ppb
Beryllium (Be)	1 ppm	-- ppb
Cadmium (Cd)	3 ppm	10 ppb
Chromium (Cr)	100 ppm	50 ppb
Copper (Cu)	170 ppm	1,000 ppb
Lead (Pb)	250 ppm	50 ppb
Nickel (Ni)	100 ppm	--
Mercury (Hg)	1 ppm	2 ppb
Selenium (Se)	4 ppm	10 ppb
Silver (Ag)	5 ppm	50 ppb
Thallium (Th)	5 ppm	--
Zinc (Zn)	350 ppm	5,000 ppb
Polycyclic Aromatic Hydrocarbons (PAHs)	10 ppm	50 ppb
Dioxins	NA	NA
Furans	NA	NA

ppm: Parts per million (mg/kg)
ppb: Parts per billion (ug/l)
--: Indicates no cleanup level was found in NJAC 7:9-6.6
NA: Not available

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX B

Boring Logs

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 001

Geologic Log

0.0' - 2.0'	Black-grey sandy and silty fill material
2.0' - 4.0'	Fill material is similar to the 0-2' interval, though saturated. Oil is found throughout sample.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	13,15,18,8	Fair
2	2-4'	7,5,4,3	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-001-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 002

Geologic Log

0.0' - 2.0'	Black sandy fill material.
2.0' - 4.0'	Black sandy fill material. Water encountered at 3.0'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	16,22,31,16	Good
2	2-4'	11,10,7,3	Good

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-002-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-1'
288E-002-02	11/16/87	Priority Pollutant Metals	2-3'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 003

Geologic Log

0.0' - 0.5'	Asphalt.
0.5' - 2.0'	Oily layer approximately 1 inch thick. Sandy fill material containing some terra cotta tile fragments.
2.0' - 4.0'	Saturated sandy fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	13,15,14,13	Fair
2	2-4'	13,15,11,5	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-003-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0.5-2.0'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 004

Geologic Log

0.0' - 2.0'	White sand with black sandy fill material. Red clay with brick fragments mixed throughout.
2.0' - 4.0'	Black sandy fill material. Water encountered at 3.8'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	19,8,5,5	Fair
2	2-4'	8,5,5,8	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-004-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-004-02	11/13/87	Priority Pollutant Metals	2-3.8'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 005

Geologic Log

0.0' - 2.0'	Fine grained black sandy and silty fill material with rock clasts and pebbles.
2.0' - 4.0'	Black sandy gravel-rich fill material. Water encountered at 3.6'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	11,6,6,3	Fair
2	2-4'	13,19,51,27	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-005-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-005-02	11/13/87	Priority Pollutant Metals	2-3.6'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 304

Geologic Log

0.0' - 2.0'	Black-grey sandy oily fill material. Water encountered at 0.5'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	10,13,10,13	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-304-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 305

Geologic Log

0.0' - 2.0'	Black sandy fill material with coal slag and pebbles.
2.0' - 4.0'	Saturated black, sandy, oily fill material. Large wood chunks encountered.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	21,13,10,9	Fair
2	2-4'	12,13,13,4	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-305-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 403

Geologic Log

0.0' - 0.5'	Black sandy fill material containing gravel and resinous material.
0.5' - 1.5'	Moist black sandy fill material.

Drilling Specifications

Drilling Method:	Hand Augered Boring
Drilling Rig:	None
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 17, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
NA	-	-	-

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-403-01	11/17/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-0.5'
288E-403-02	11/17/87	Priority Pollutant Metals	0.5-1.5'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1002

Geologic Log

0.0' - 2.0'	Black fill material with white sand and gravel.
2.0' - 3.4'	Black sandy fill material with gravel similar to 0-2' interval, though no white sand. Concrete fragments encountered.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	31,9,7,3	Fair
2	2-3.4'	15,18,100/3	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1002-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-1002-02	11/16/87	Priority Pollutant Metals	2-3.4"

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1304

Geologic Log

0.0' - 2.0'	Mostly gravel in a sandy fill material.
2.0' - 4.0'	Gravelly sandy fill material.
	Water encountered at 2.2'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	22,18,11,6	Poor
2	2-4'	3,4,4,2	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1304-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0 - 2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1404

Geologic Log

0.0' - 2.0'	Black sandy fill with some gravel. Oily.
2.0' - 4.0'	Similar to above; no gravel.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	26,16,9,6	Fair
2	2-4'	9,6,3,2	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1404-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1505

Geologic Log

0.0' - 2.0'	Black-grey sandy and silty fill material with 1" band of oil-like material.
2.0' - 4.0'	Saturated black-grey sandy and silty fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	17,19,25,23	Poor
2	2-4'	15,16,17,7	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1505-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1604

Geologic Log

0.0' - 2.0'	Black-grey sandy and silty fill material. Oil-stained.
2.0' - 4.0'	Saturated oily fill material. Oil content appears to increase with depth. Water encountered at 2.4'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,7,11,9	Fair
2	2-4'	4,4,3,4	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1604-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1704

Geologic Log

0.0' - 2.0'	Black sandy and silty fill material.
2.0' - 4.0'	Black saturated gravelly fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	18,8,3,4	Fair
2	2-4'	3,4,3,1	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1704-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1705

Geologic Log

0.0' - 2.0'	Very compact black sandy and silty fill material white rock fragments present.
2.0' - 4.0'	Saturated fill material. Oily. Water encountered at 2.5'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	36,38,51,64	Good
2	2-4'	31,16,12,13	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1705-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 2104

Geologic Log

0.0' - 1.0'	Concrete and asphalt.
1.0' - 2.0'	Sandy black fill material.
2.0' - 4.0'	Saturated sandy black fill material. Oily.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	7,3,2,1	Poor
2	2-4'	4,6,5,4	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-2104-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	1-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 2302

Geologic Log

0.0' - 2.0'	Black sandy fill material with some red brick fragments.
2.0' - 4.0'	Black sandy fill material. Water encountered at approximately 3.5'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	10,11,4,5	Poor
2	2-4'	4,3,3,4	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-2302-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-2302-02	11/16/87	Priority Pollutant Metals	2-3.5'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 2502

Geologic Log

0.0' - 2.0'	Black sandy fill material with some coal slag.
2.0' - 4.0'	Black sandy fill material. Water encountered at 2.8'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,5,5,5	Fair
2	2-4'	12,10,10,10	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-2502-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX C

Well Specifications

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 12
Permit No. 2611924-2

Geologic Log

0.0' - 2.0'	Brown fill with brick fragments.
	Water encountered at 4'.
8.0' - 10.0'	Silty clay, poorly decomposed roots.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	8.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	8.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	18,18,11,8	10"
2	2-4'	18,38,8,7	6"
3	5-7'	1,1,0,0	None
4	8-10'	weight of driller	Fair

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 12 (Continued)
Permit No. 2611924-2

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW12-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW12-21	11/12/87	Priority Pollutant Metals	0-2'
288E-MW12-02	11/12/87	Priority Pollutant Metals	2-4'
288E-MW12-GW01	12/9/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 13
Permit No. 2611925-1

Geologic Log

0.0' - 2.0'	Brown-grey silty fill material.
5.0' - 7.0'	Black-grey silty fill material with gravel.
7.0' - 9.0'	Loosely packed black-grey silty fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	7.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	7.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	14,11,6,6	Fair
2	5-7'	6,4,5,7	6"
3	7-9'	Weight of driller	4"

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW13-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW13-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 14
Permit No. 2611922-6

Geologic Log

0.0' - 2.0'	Unconsolidated black fill material.
2.0' - 4.0'	Brown-grey fill material with gravel.
5.0' - 7.0'	Fill material with gravel.
8.0' - 10.0'	Grey clay with poorly decomposed grass.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	8.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	8.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,4,5,5	9"
2	2-4'	5,3,3,4	14"
3	5-7'	28,21,12,9	18"
4	8-10'	Weight of driller	20"

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW14-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW14-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 15
Permit No. 2611921-8

Geologic Log

0.0' - 0.5'	Dark grey to black loose silty fill material.
2.0' - 4.0'	Brown-grey fill material. Water encountered at approximately 2.5'.
5.0' - 7.0'	Loose gravel and brown to grey fill material.
8.0' - 10.0'	Clay containing decomposed grass.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	8.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	8.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,37,15,11	14"
2	2-4'	13,17,19,11	14"
3	5-7'	1,3,6,17	Fair
4	8-10'	1,1,1,1	Good

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 15 (Continued)
Permit No. 2611921-8

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW15-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW15-02	11/11/87	Priority Pollutant Metals	2-4'
288E-MW15-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide VOC+15	NA
288E-MW15-GW02	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 16
Permit No. 2611916-1

Geologic Log

0.0' - 2.0'	Brown sandy fill material.
2.0' - 4.0'	Over-saturated brown sandy fill material.
5.0' - 7.0'	Peat and clay.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	5.5' bgs - 2.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	2.5' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	5.5' bgs - 2.0' bgs	No. 1 well sand	---	-----
Bentonite seal	2.0' bgs - 1.0' bgs	Bentonite pellets	---	-----
Grout	1.0' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	7,9,19,21	Fair
2	2-4'	29,41,100/5	Fair
3	5-7'	Weight of hammer	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW16-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW16-21	11/13/87	Priority Pollutant Metals	0-2'
288E-MW16-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 17
Permit No. 2611918-8

Geologic Log

0.0' - 2.0'	Black, sandy fill material.
2.0' - 4.0'	Moist black sandy fill material.
5.0' - 7.0'	Grey clay with peat.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	5.5' bgs - 2.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	2.5' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	5.5' bgs - 2.0' bgs	No. 1 well sand	---	-----
Bentonite seal	2.0' bgs - 1.0' bgs	Bentonite pellets	---	-----
Grout	1.0' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	13,19,100/2	Fair
2	2-4'	1,3,6,2	None
3	5-7'	Weight of driller	2"

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 17 (Continued)
Permit No. 2611918-8

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW17-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW17-02	11/13/87	Priority Pollutant Metals	2-4'
288E-MW17-GW01	12/9/87	Priority Pollutant Metals, TPHC, Cyanide VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 18
Permit No. 2611926-9

Geologic Log

0.0' - 2.0'	Black, oily fill material.
2.0' - 4.0'	Black, oily fill material.
5.0' - 7.0'	Poorly compacted, black oily fill material.
8.0' - 10.0'	Poorly compacted fill material.
10.0' - 12.0'	Grey to black silty clay.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	10' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	10' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	2,3,3,2	6"
2	2-4'	6,3,3,1	4"
3	5-7'	7,12,3,1	4"
4	8-10'	Weight of driller	3"
5	10-12'	Weight of driller	24"

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 18 (Continued)
Permit No. 2611926-9

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW18-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW18-21	11/12/87	Priority Pollutant Metals	0-2'
288E-MW18-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

AKH000773

945990574

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 19
Permit No. 2611917-0

Geologic Log

0.0' - 2.0'	Crushed terra cotta brick in a silty fill matrix.
5.0' - 7.0'	Grey clay.
7.0' - 9.0'	Grey clay.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	5.5' bgs - 2.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	2.5' bgs - 1.5' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.0' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	5.5' bgs - 2.0' bgs	No. 1 well sand	---	-----
Bentonite seal	2.0' bgs - 1.0' bgs	Bentonite Pellets	---	-----
Grout	1.0' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	17,5,1,6	6"
2	5-7'	Weight of driller	20"
3	7-9'	Weight of driller	24"

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW19-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW19-GW01	12/9/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 24
Permit No. 2611920-0

Geologic Log

0.0' - 2.0'	Black sandy fill material.
2.0' - 4.0'	Sandy fill; similar to 0-2' interval. Water encountered at approximately 2.5'.
7.0' - 8.0'	Peat layer with some clay intermixed.
8.0' - 10.0'	Solid grey clay, no peat.
12.0' - 14.0'	Grey clay.
20.0' - 22.0'	Dark green-black to black silty clay. Wood fragments present.
28.0' - 29.0'	Black silty clay.
29.0' - 30.0'	Fine to medium-grained sand.
33.0' - 35.0'	Coarse grey sand. Increased gravel content.
38.0' - 40.0'	Dark grey, fine to medium-grained saturated sand. Reddish-brown gravel between 39.3 - 39.7 feet.
40.0' - 42.0'	Reddish brown clay, sandy from 40-41 feet.

Drilling Specifications

Drilling Method:	Hollow Stem Auger Boring/Mud Rotary
Rig:	CME 750
Well Driller/License Number:	Rick Empson #1312
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987; November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	40' bgs - 30' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	30' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	40' bgs - 28' bgs	No. 1 well sand	---	-----
Bentonite seal	28' bgs - 25' bgs	Bentonite pellets	---	-----
Grout	25' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 24 (Continued)
Permit No. 2611920-0

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	7,9,50/2	Fair
2	2-4'	10,6,4,3	Fair
3	4-6'	1,1,1,1	Fair
4	8-10'	1,1,1,1	Fair
5	12-14'	Weight of driller	Fair
6	28-30'	6,9,12,13	Fair
7	33-35'	21,10,9,9	Fair
8	38-40'	9,12,10,10	Fair
9	40-42'	Weight of driller	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW24-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW24-GW01	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

AKH000776

945990577

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 25
Permit No. 2611923-4

Geologic Log

0.0' - 8.0'	Sandy, gravelly fill material.
20.0' - 22.0'	Dark grey to greenish gray silty clay with plant fragments.
28.0' - 30.0'	Fine to medium-grained sand; brown to reddish brown clay at 28.0-28.3'.
38.0' - 40.0'	Coarse grained sand and gravel. Clay encountered at 40 feet.

Drilling Specifications

Drilling Method:	Mud Rotary
Rig:	CME 750
Well Driller/License Number:	Rick Empson #1312
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987; November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	40' bgs - 28' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	28' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	40' bgs - 27' bgs	No. 1 well sand	---	-----
Bentonite seal	27' bgs - 25' bgs	Bentonite pellets	---	-----
Grout	25' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0- 8'	10,7,5,1	Fair
2	20-22'	1,1,3,5	Fair
3	28-30'	8,15,15,17	Fair
4	38-40'	6,10,15,12	Fair

AKH000777

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 25 (Continued)
Permit No. 2611923-4

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW25-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW25-GW01	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA
288E-MW25-GW02	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 26
Permit No. 2611919-6

Geologic Log

0.0' - 2.0'	Gravelly dark black sand with wood fragments.
2.0' - 4.0'	Similar to 0-2' interval with increased moisture content.
4.0' - 6.0'	Very black fill material, peat and clay 6.0'.
6.0' - 8.0'	Dark green to black silty clay.
20.0' - 22.0'	Silty grey clay with shell and grass fragments.
25.0' - 27.0'	Grey silty clay.
30.0' - 32.0'	Wet medium-grey/green sand with quartz chunks.
38.0' - 40.0'	Gravel at top of sample, grading into clay toward bottom of sample.

Drilling Specifications

Drilling Method:	Hollow Stem Auger Boring/Mud Rotary
Rig:	CME 750
Well Driller/License Number:	Rick Empson #1312
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987, November 16, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	40' bgs - 30' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	30' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	40' bgs - 29' bgs	No. 1 well sand	---	-----
Bentonite seal	29' bgs - 27' bgs	Bentonite Pellets	---	-----
Grout	27' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 26 (Continued)
Permit No. 2611919-6

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0- 2'	4,10,16,18	Fair
2	2- 4'	16,3,2,10	Fair
3	20-22'	Weight of driller	Fair
4	25-27'	Weight of driller	Fair
5	30-32'	11,7,9,14	Fair
6	38-40'	3,4,4,8	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW26-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW26-21	11/12/87	Priority Pollutant Metals	0-2'
288E-MW26-02	11/12/87	Priority Pollutant Metals	2-4'
288E-MW26-GW01	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

AKH000781

FN 00922

945990582

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX D

Summary of Well Data

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Number	Permit Number	A Ground Surface Elevation (ft amsl)	B Inner Casing Elevation (ft amsl)	C Outer Casing Elevation (ft amsl)	D Total Depth (feet)
1	2609839	5.40	7.72	8.20	6.10
2	2609840	6.01	7.92	8.15	10.51
3	2609841	6.62	6.24	6.62	6.33
4	2609842	6.56	5.83	6.56	7.48
5	2609843	6.33	7.67	8.53	8.73
6	2609844	6.48	8.80	9.25	6.75
7	2609845	5.28	7.44	7.69	12.74
8	2609846	5.89	5.62	5.89	10.64
9	2609847	6.46	8.76	8.94	12.82
10	2609848	6.94	9.08	9.40	8.10
11	2609849	6.35	8.61	9.00	10.96
12	2611924	6.76	9.16	9.29	7.71
13	2611925	6.85	8.85	9.18	7.15
14	2611922	6.68	9.03	9.13	7.55
15	2611921	6.81	9.04	9.14	7.96
16	2611916	5.22	7.29	7.38	4.79
17	2611918	4.60	6.64	6.80	4.30
18	2611926	5.41	7.42	8.08	8.99
19	2611917	6.11	8.00	8.63	4.22
21	2609851	5.94	8.32	8.48	45.83
22	2609852	5.88	5.43	5.88	41.67
23	2609850	5.48	7.53	7.81	39.92
24	2611920	6.93	9.03	9.23	39.06
25	2611923	6.11	7.83	8.01	39.58
26	2611919	6.61	6.43	6.61	36.90

ft amsl = feet above mean sea level

AKH000784

945990585

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX E

Well Sampling Data

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 1

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 6.7 (4 gallons), pumped dry three times

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	14:40	12.5	6.95	360
12/9/87	14:45	12.5	7.04	500
12/9/87	14:55	12.5	6.93	500
12/9/87	15:03	12.5	7.00	500

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 2

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	13:39	13.0	6.91	750
12/9/87	13:45	12.5	6.93	750
12/9/87	13:53	12.5	6.90	600
12/9/87	13:58	12.5	6.80	600
12/9/87	14:03	12.5	6.80	600

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 3

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.5 (7 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	12:11	12.5	6.68	1300
12/9/87	12:13	12.0	6.57	1200
12/9/87	12:16	12.0	6.58	1200
12/9/87	12:19	12.0	6.57	1200

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 4

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: dry after ~5 gallons

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	10:44	13.0	6.81	15400
12/9/87	10:49	14.0	6.60	15600

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 5

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 4.4

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	13:40	14.0	6.98	1600
12/8/87	13:45	14.0	6.80	1520
12/8/87	13:50	14.0	6.73	1400
12/8/87	13:55	14.0	6.68	1300
12/8/87	14:00	14.0	6.77	1200
12/8/87	14:05	14.0	6.75	1200
12/8/87	14:10	14.0	6.74	1160

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 6

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.5

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	14:41	13.0	6.67	900
12/8/87	14:46	13.0	6.63	920
12/8/87	14:52	13.0	6.58	940
12/8/87	15:03	13.0	6.58	950
12/8/87	15:10	13.0	6.55	950

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 7

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: dry after 2.6 (~ 10 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	2:16	11.5	7.01	16100
12/8/87	2:25	12.0	7.08	15500
12/8/87	2:29	12.0	7.06	15500
12/8/87	2:34	12.0	7.05	15600
12/8/87	2:43	12.0	7.22	15500

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 8

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 1.4 (~ 10 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	12:07	13.0	6.48	12200
12/9/87	12:14	12.5	6.98	12450
12/9/87	12:25	13.0	7.05	12200

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 9

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	11:31	14.0	6.50	1350
12/8/87	11:37	14.0	6.37	1330
12/8/87	11:45	14.0	6.28	1280
12/8/87	11:53	14.0	6.28	1330
12/8/87	11:57	14.0	6.25	1330

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 10

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	10:35	12.0	6.60	780
12/9/87	10:40	12.0	6.66	750
12/9/87	10:45	12.0	6.70	750
12/9/87	10:50	12.0	6.65	750

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 11

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0 (9 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	11:12	12.0	7.02	2600
12/9/87	11:19	12.0	6.99	2250
12/9/87	11:23	12.0	6.90	2250
12/9/87	11:26	12.0	6.87	2300
12/9/87	11:28	12.0	6.87	2300

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 12

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0 (7 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	11:28	12.5	6.99	1470
12/9/87	11:32	12.0	6.84	1410
12/9/87	11:36	12.0	7.02	1420
12/9/87	11:40	12.0	7.04	1420

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 13

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.3

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	15:28	12.0	6.76	485
12/8/87	15:32	12.0	6.74	515
12/8/87	15:36	12.0	6.79	950
12/8/87	15:40	12.0	6.80	1000
12/9/87	15:44	12.0	6.80	1000
12/9/87	15:49	12.0	6.78	1000

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 14

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.5

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	12:25	12.0	6.66	262
12/8/87	12:33	12.0	6.76	280
12/8/87	12:38	12.0	6.88	282
12/8/87	12:41	12.0	6.90	290
12/8/87	12:46	12.0	6.88	290

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 15

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.4

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	11:32	12.5	6.96	600
12/8/87	11:40	12.5	6.83	600
12/8/87	11:45	12.0	6.84	720
12/8/87	11:48	12.0	6.83	720
12/8/87	11:53	12.0	6.80	720

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 16

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 1.5 (4 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	1:39	11.0	6.69	4000
12/8/87	1:42	11.0	6.77	4000
12/8/87	1:51	11.0	6.83	4250

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 17

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0 (~ 2.5 - 3.0 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	14:39	14.0	7.79	14400
12/9/87	14:42	9.0	7.80	11100
12/9/87	14:44	9.0	7.70	11100

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 18

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	12:22	13.5	6.57	1560
12/8/87	12:30	14.0	6.52	1590
12/8/87	12:40	14.0	6.55	1660
12/8/87	12:44	14.0	6.49	1700
12/8/87	12:48	14.0	6.49	1670
12/8/87	12:57	14.0	6.49	1660

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 19

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 1.2 (2 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	1:45	10.5	8.23	12800

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 21

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 1.1 (31 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	15:05	15.0	12.50	9900
12/10/87	15:11	15.0	7.96	9900
12/10/87	15:15	15.0	8.04	10500
12/10/87	15:20	15.0	11.30	10400

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 23

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	14:23	16.0	7.88	10500
12/10/87	14:31	16.0	7.14	11000
12/10/87	14:36	15.0	6.87	12500
12/10/87	14:41	16.0	6.91	12000
12/10/87	14:46	16.0	6.90	12000

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 24

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	12:11	16.0	6.98	10000
12/10/87	12:20	14.5	6.64	11500
12/10/87	12:25	14.5	6.60	11500
12/10/87	12:30	15.0	6.62	11500

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 25

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	13:33	16.0	6.75	9000
12/10/87	13:40	16.0	6.59	11000
12/10/87	13:45	16.0	6.60	11800
12/10/87	13:50	16.0	6.57	11800

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 26

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	11:29	15.0	6.68	9800
12/10/87	11:35	15.0	6.78	11000
12/10/87	11:45	15.0	6.60	11500
12/10/87	11:51	15.0	6.59	11500

AKH000811

APPENDIX F

Sampling Location Elevations and Coordinates

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

SAMPLING LOCATION	GROUND SURFACE ELEVATION (MSL)	COORDINATES NORTH	COORDINATES EAST
Boring 001	6.19	9,887.99	10,240.08
Boring 002	6.38	9,721.22	10,595.29
Boring 003	5.33	10,062.96	10,243.87
Boring 004	6.14	10,130.55	10,542.45
Boring 005	6.00	9,962.27	10,896.95
Boring 101	6.60	10,243.41	10,231.97
Boring 201	6.15	10,272.92	10,493.96
Boring 301	6.02	10,249.80	10,556.47
Boring 302	6.08	10,214.96	10,628.52
Boring 303	5.90	10,176.16	10,707.92
Boring 304	5.92	10,255.92	10,542.02
Boring 305	5.94	10,181.05	10,701.10
Boring 401	6.11	10,136.33	10,791.96
Boring 402	6.01	10,122.01	10,825.50
Boring 403	5.97	10,138.39	10,781.25
Boring 501	6.07	10,085.44	10,915.42
Boring 701	6.23	9,971.20	10,827.43
Boring 801	6.93	10,235.83	10,229.86
Boring 802	6.97	10,212.35	10,211.26
Boring 803	6.89	10,199.43	10,206.84
Boring 804	5.86	10,173.61	10,206.98
Boring 1001	7.06	10,122.28	10,365.86
Boring 1002	7.04	10,119.93	10,368.20
Boring 1301	5.85	9,981.16	10,214.24
Boring 1302	5.68	10,013.35	10,204.12
Boring 1303	5.90	9,972.42	10,182.76
Boring 1304	5.89	9.983.48	10,214.49
Boring 1401	5.51	9.954.40	10,333.64
Boring 1402	5.24	9,956.97	10,305.71
Boring 1403	5.97	9,931.78	10,351.43
Boring 1404	5.33	9,964.06	10,302.41
Boring 1501	5.48	9,940.31	10,269.95
Boring 1502	6.10	9,909.64	10,310.41
Boring 1503	6.10	9,893.00	10,266.06
Boring 1505	5.42	9,940.42	10,272.94
Boring 1601	5.94	9,958.26	10,394.15
Boring 1602	6.08	9,939.19	10,388.73
Boring 1604	6.20	9,959.91	10,411.63
Boring 1701	6.71	9,907.50	10,396.45
Boring 1702	6.45	9,891.84	10,348.60
Boring 1703	6.55	9,843.37	10,355.78
Boring 1704	6.85	9,905.27	10,395.80
Boring 1705	6.51	9,841.28	10,353.17
Boring 1801	6.54	9,755.62	10,504.51
Boring 1902	5.81	9,676.08	10,735.80

SAMPLING LOCATION	GROUND SURFACE ELEVATION (MSL)	COORDINATES NORTH	COORDINATES EAST
Boring 2101	5.87	9,766.83	10,763.19
Boring 2102	5.74	9,739.56	10,792.09
Boring 2103	5.90	9,747.94	10,764.09
Boring 2104	5.99	9,769.05	10,765.01
Boring 2201	7.71	9,759.32	10,600.92
Boring 2301	6.18	10,004.11	10,422.97
Boring 2302	6.32	9,996.88	10,418.86
Boring 2501	6.74	9,918.61	10,526.55
Boring 2502	6.75	9,915.70	10,527.06
Boring 2701	6.35	10,131.66	10,736.88
Boring 2801	6.18	10,082.08	10,726.41

WELL #	GROUND SURFACE ELEVATION (MSL)	COORDINATES NORTH	COORDINATES EAST
MW-1	5.40	10,405.54	10,261.47
MW-2	6.01	9,989.70	10,072.27
MW-3	6.62	10,086.47	10,393.97
MW-4	6.56	10,060.40	10,606.55
MW-5	6.33	9,988.75	10,657.18
MW-6	6.48	9,789.44	10,467.75
MW-7	5.28	10,069.44	10,948.85
MW-8	5.89	9,963.56	10,891.26
MW-9	6.46	9,664.57	10,743.68
MW-10	6.94	9,875.28	10,505.48
MW-11	6.35	10,092.74	10,713.76
MW-12	6.76	10,056.92	10,472.66
MW-13	6.85	9,975.96	10,433.92
MW-14	6.68	9,908.29	10,570.72
MW-15	6.81	9,843.85	10,607.94
MW-16	5.22	9,890.45	10,756.20
MW-17	4.60	9,854.48	10,830.66
MW-18	5.41	9,740.41	10,822.85
MW-19	6.11	10,031.67	10,767.41
MW-21	5.94	9,993.49	10,075.52
MW-22	5.88	9,966.79	10,893.10
MW-23	5.48	10,401.90	10,258.58
MW-24	6.93	9,865.30	10,508.37
MW-25	6.11	10,025.44	10,765.47
MW-26	4.29	9,851.57	10,837.52

AKH000816

APPENDIX G

Summary Tables

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data

	Informal ECRA Cleanup Guidelines	001-01	002-01	002-02	003-01	004-01	004-02	005-01	005-02	304-01	305-01	403-01	403-02
Priority Pollutant Metals (ppm)													
Antimony	2												
Arsenic	20												
Beryllium	400												
Cadmium	3			3.3									4.46
Chromium	100									106			
Copper	170			350									
Lead	250			863				262				213	
Mercury	1			1.86						1.17	1.4		
Nickel	100												
Selenium	4												
Thallium	5												
Zinc	350			728				483					
Silver	5												

Notes:
1. All values reported in parts per million (ppm).
2. Only those values above informal ECRA Cleanup Guidelines are provided.

AKH000818

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data (continued)

	Informal ECRA Cleanup Guidelines	1002-01	1002-02	1304-01	1404-01	1505-01	1604-01	1704-01	1705-01	2104-01	2302-01	2302-02	2502-01
Priority Pollutant Metals (ppm)													
Antimony	2									3.46			
Arsenic	20									2.4			
Beryllium	400												
Cadmium	3									3.98	3.42	3.71	
Chromium	100												
Copper	170							176		369	383	275	
Lead	250					371		332	375	1450	1280	978	268
Mercury	1							1.26	1.15	1.57	1.83	1.61	
Nickel	100												
Selenium	4												
Thallium	5												
Zinc	350					352			358		916	671	
Silver	5												9

Notes:
1. All values reported in parts per million (ppm).

2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000819

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data (continued)

	Informal ECRA Cleanup Guidelines	MW12-01	MW12-21	MW12-02	MW13-01	MW14-01	MW15-01	MW15-02	MW16-01	MW16-21	MW17-01	MW17-02
Priority Pollutant Metals (ppm)												
Antimony	2			4.9								
Arsenic	20											
Beryllium	400											
Cadmium	3			3.81						4.24		
Chromium	100											
Copper	170	424	555	469	219	208		426		233		593
Lead	250	352	459		874	505	355	899	698	1330		477
Mercury	1				1.11	2.44		2	1.03	1.07		
Nickel	100	163	241							127		124
Selenium	4											
Thallium	5											
Zinc	350	1020	1200	857	521	441	435	847		411	489	1190
Silver	5											

Notes:
1. All values reported in parts per million (ppm).

2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000820

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data (continued)

	Informal ECRA Cleanup Guidelines	MW18-01	MW18-21	MW19-01	MW24-01	MW26-01	MW26-21	MW26-02
Priority Pollutant Metals (ppm)								
Antimony	2						2.6	
Arsenic	20							
Beryllium	400							
Cadmium	3	3.11						
Chromium	100					180	127	
Copper	170	358	407		240	991	1390	404
Lead	250	1450	1420		882	816	1620	379
Mercury	1	6.48	2.37		1.65			
Nickel	100					267	212	
Selenium	4							
Thallium	5							
Zinc	350	659	746		591	2670	2040	895
Silver	5							

Notes:
1. All values reported in parts per million (ppm).
2. Only those values above informal ECRA Cleanup Guidelines are provided.
3. No sample was collected during the installation of Monitoring Well 25 due to a very high water table.

AKH000821

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85405

Table 6-2: Ensco Hydrocarbon Fingerprinting Data

ENVIRON ID	Ensco ID	ppm GRAVIMETRIC	ppm GRAVIMETRIC F1 + F2	ppm GC/FID F1 + F2	ppm GC/FID	Reporting Limits for Individual Hydrocarbons	Reporting Limits for Total Product	Percent Solids	Total Fatty Acid Methyl Esters	Total Lipid Equivalents	Reporting Limits	Date Sampled	Comments	Qualitative Identifications
200E-1002-01	6007-01 (F2)	420			28	1	25	89				11/16/87		Similar to 4- & 5- ring polynuclear aromatic hydrocarbons.
200E-1002-01	6007-01 (F1)	330	750	35.6	7.6	1	25	89				11/16/87		NA
200E-1002-01	6007-01 (FA)	300						89	ND	ND	25	11/16/87		NA
200E-1002-01	6007-01D (F2	1000			24	1	25	89				11/16/87	Duplicate	Similar to 4-to 5- ring polynuclear aromatic hydrocarbons.
200E-1002-01	6007-01D (F1	580	1580	28.9	4.9	1	25	88				11/16/87	Duplicate	NA
200E-1002-01	6007-01D (FA	700						89	ND	ND	25	11/16/87	Duplicate	NA
200E-1304-01	5930-01 (F2)	610			7.8	1	25	81				11/10/87		NA
200E-1304-01	5930-01 (F1)	470	1080	237.8	230	1	25	81				11/10/87		Similar to a petroleum product in the fuel Oil No. 6 range.
200E-1304-01	5930-01 (FA)	17000						81	16000	16000	500	11/10/87		Similar to castor oil.
200E-1404-01	5930-18 (F2)	1200			330	1	25	87				11/13/87		Similar to a mixture of gasoline and a petroleum product in the fuel oil/lubricating oil range
200E-1404-01	5930-18 (F1)	810	2010	670	340	1	25	87				11/13/87		Similar to a mixture of paint thinner and light and heavy fuel oils.
200E-1404-01	5930-18 (FA)	190						87	380	520	500	11/13/87		Similar to soybean oil.
200E-1505-01	5930-02 (F2)				52	1	25	77				11/10/87		Similar to gasoline.
200E-1505-01	5930-02 (F1)	ND	ND	59.7	7.7	1	25	77				11/10/87		NA
200E-1505-01	5930-02 (FA)							77	ND	ND	25	11/10/87		NA
200E-1604-01	5930-05 (F2)	680			330	1	25	86				11/10/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-1604-01	5930-05 (F1)	800	1480	1260	930	1	25	86				11/10/87		Similar to paint thinner & a petroleum product in the fuel oil/lubricating oil range.
200E-1604-01	5930-05 (FA)	2200						86	4900	6700	500	11/10/87		Similar to soybean oil.
200E-1704-01	5930-17 (F2)	1500			860	1	25	82				11/13/87		Similar to lubricating oil with 4- to 5-ring polynuclear hydrocarbons.
200E-1704-01	5930-17 (F1)	3400	4900	2160	1300	1	25	82				11/13/87		Similar to lubricating oil.
200E-1704-01	5930-17 (FA)	1700						82	1200	1700	250	11/13/87		Similar to soybean oil.
200E-1705-01	6007-02 (F2)	210			210	1	25	82				11/16/87		Similar to coal tar.
200E-1705-01	6007-02 (F1)	290	500	450	240	1	25	82				11/16/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-1705-01	6007-02 (FA)	220						82	ND	ND	25	11/16/87		NA
200E-1705-01	6007-02D (F2	240			120	1	25	82				11/16/87	Duplicate	This sample has GC/FID characteristics that are similar to coal tar.
200E-1705-01	6007-02D (F1	220	460	220	100	1	25	82				11/16/87	Duplicate	Similar to a petroleum product in the fuel oil/lubricating range.
200E-1705-01	6007-02D (FA	310						82	36	48	25	11/16/87	Duplicate	Similar to soybean oil.
200E-1902-01	5930-09 (F2)	360			200	1	25	68				11/12/87		Similar to gasoline & a petroleum product in the fuel oil/lubricating oil range.
200E-1902-01	5930-09 (F1)	548	900	1030	830	1	25	68				11/12/87		Similar to paint thinner & a petroleum product in the fuel oil/lubricating oil range.
200E-1902-01	5930-09 (FA)	7300						68	12000	16000	500	11/12/87		Similar to soybean oil.
200E-2104-01	6007-05 (F2)	360			3600	1	25	84				11/16/87		Similar to a mixture of gasoline & a petroleum product in the fuel oil/lubricating oil range.
200E-2104-01	6007-05 (F1)	1500	1860	12000	8400	20	500	84				11/16/87		Similar to paint thinner.
200E-2104-01	6007-05 (FA)	2600						84	3800	5100	500	11/16/87		Similar to soybean oil.
200E-2302-01	6007-04 (F2)	5000			540	1	25	85				11/16/87		Similar to a mixture of fuel oil & 4- to 5- ring polynuclear aromatic hydrocarbons.
200E-2302-01	6007-04 (F1)	3800	8800	1240	700	1	25	85				11/16/87		Similar to a mixture of paint thinner & fuel oils.
200E-2302-01	6007-04 (FA)	980						85	190	250	25	11/16/87		Similar to soybean oil.
200E-2502-01	6007-03 (F2)	1300			3100	1	25	80				11/16/87		Similar to coal tar.
200E-2502-01	6007-03 (F1)	580	1880	3350	250	1	25	80				11/16/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-2502-01	6007-03 (FA)	9700						80	18000	16000	1250	11/16/87		Similar to linseed oil.
200E-[illegible]-01	5930-16 (F2)	230			220	1	25	81				11/13/87		Similar to 4- to 5- ring polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
200E-[illegible]-01	5930-16 (F1)	1100	1330	720	500	1	25	81				11/13/87		Similar to a mixture of paint thinner, kerosene, & a petroleum product in the fuel oil/lubricating oil range.
200E-[illegible]-01	5930-16 (FA)	420						81	620	840	250	11/13/87		Similar to soybean oil.

H000822

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85405

Table 6-2: Erdman Hydrocarbon Fingerprinting Data

Enviro ID	Erco ID	ppm GRAVIMETRIC	ppm GRAVIMETRIC F1 + F2	ppm GC/FID F1 + F2	ppm GC/FID	Reporting Limits for Individual Hydrocarbons	Reporting Limits for Total Product	Percent Solids	Total Fatty Acid Methyl Esters	Total Lipid Equivalents	Reporting Limits	Date Sampled	Comments	Qualitative Identifications
200E-305-01	4007-06 (F2)	1000			1900	1	25	88				11/16/87		Similar to a mixture of gasoline & coal tar.
200E-305-01	4007-06 (F1)	750	1750	5900	4000	20	500	88				11/16/87		Similar to paint thinner.
200E-305-01	4007-06 (FA)	25000						88	39000	52000	1250	11/16/87		Similar to soybean oil.
200E-405-01	4007-07 (F2)	110			1000	1	25	96				11/16/87		Similar to a mixture of gasoline & fuel oil.
200E-405-01	4007-07 (F1)	860	970	1440	440	1	25	96				11/16/87		Similar to fuel Oil No. 6.
200E-405-01	4007-07 (FA)	47000						96	120000	160000	2500	11/16/87		Similar to soybean oil.
200E-HA12-01	3930-12 (F2)	5800			500	1	25	92				11/12/87		Similar to lubricating oil.
200E-HA12-01	3930-12 (F1)	5200	11000	930	430	1	25	92				11/12/87		Similar to lubricating oil.
200E-HA12-01	3930-12 (FA)	1000						92	65	120	25	11/12/87		Similar to soybean oil.
200E-HA13-01	3930-07 (F2)	1200			880	1	25	91				11/11/87		Similar to coal tar.
200E-HA13-01	3930-07 (F1)	270	1470	1170	290	1	25	91				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA13-01	3930-07 (FA)	800						91	1400	1900	500	11/11/87		Similar to soybean oil.
200E-HA14-01	3930-06 (F2)	1100			260	1	25	81				11/11/87		Similar to a mixture of polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
200E-HA14-01	3930-06 (F1)	630	1730	650	390	1	25	81				11/11/87		Similar to a petroleum produt in the fuel oil/lubricating oil range.
200E-HA14-01	3930-06 (FA)	720						81	170	170	25	11/11/87		Similar to castor oil.
200E-HA15-01	3930-04 (F2)	5000			340	1	25	84				11/11/87		Similar to a mixture of polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
200E-HA15-01	3930-04 (F1)	4100	9100	660	320	1	25	84				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA15-01	3930-04 (FA)	420						84	74	100	25	11/11/87		Similar to soybean oil.
200E-HA16-01	3930-15 (F2)	640			450	1	25	81				11/13/87		Similar to coal tar.
200E-HA16-01	3930-15 (F1)	540	1180	800	350	1	25	81				11/13/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA16-01	3930-15 (FA)	1000						81	130	150	25	11/13/87		Similar to castor oil.
200E-HA17-01	3930-14 (F2)	ND			4.6	1	25	81				11/13/87		NA
200E-HA17-01	3930-14 (F1)	220	220	204.6	200	1	25	81				11/13/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA17-01	3930-14 (FA)	360						81	ND	ND	25	11/13/87		NA
200E-HA18-01	3930-10 (F2)	340			120	1	25	78				11/12/87		Similar to polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
200E-HA18-01	3930-10 (F1)	290	630	260	140	1	25	78				11/12/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA18-01	3930-10 (FA)	280						78	ND	ND	25	11/12/87		NA
200E-HA19-01	3930-13 (F2)	ND			6.4	1	25	85				11/12/87		NA
200E-HA19-01	3930-13 (F1)	ND	ND	6.4	ND	1	25	85				11/12/87		NA
200E-HA19-01	3930-13 (FA)	150						85	ND	ND	25	11/12/87		NA
200E-HA04-01	3930-05 (F2)	1100			280	1	25	84				11/11/87		Similar to a mixture of gasoline, polynuclear aromatic hydrocarbons, & a petroleum product in the fuel oil/lubricating oil ranc
200E-HA04-01	3930-05 (F1)	970	2070	650	370	1	25	84				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA04-01	3930-05 (FA)	630						84	49	67	25	11/11/87		Similar to soybean oil.
200E-HA05-01	3930-08 (F2)	ND			5.8	1	25	82				11/11/87		NA
200E-HA05-01	3930-08 (F1)	ND	ND	5.8	ND	1	25	82				11/11/87		NA
200E-HA05-01	3930-08 (FA)	ND						82	ND	ND	25	11/11/87		NA
200E-HA06-01	3930-11 (F2)	ND			6.2	1	25	86				11/12/87		NA
200E-HA06-01	3930-11 (F1)	180	180	256.2	250	1	25	86				11/12/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
200E-HA06-01	3930-11 (FA)	230						86	ND	ND	25	11/12/87		NA
Erco Blank	3930-100 (F2	ND			ND	1	25	NA				NA		NA
Erco Blank	3930-100 (F1	ND	ND	ND	ND	1	25	NA				NA		NA
Erco Blank	3930-100 (FA	ND						NA	ND	ND	25	NA		NA

AKH000823

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table 6-2: Ensaco Hydrocarbon Fingerprinting Data

ENVIRON ID	Erco ID	ppm GRAVIMETRIC	ppm GRAVIMETRIC F1 + F2	ppm GC/FID F1 + F2	ppm GC/FID	Reporting Limits for Individual Hydrocarbons	Reporting Limits for Total Product	Percent Solids	Total Fatty Acid Methyl Esters	Total Lipid Equivalents	Reporting Limits	Date Sampled	Comments	Qualitative Identifications
Erco Blank	6007-07B (F2	ND			ND	1	25	NA				NA		NA
Erco Blank	6007-07B (F1	ND	ND	ND	ND	1	25	NA				NA		NA
Erco Blank	6007-07B (FA	ND						NA	ND	ND	25	11/16/87		NA
Erco Blank	6007-10B (F2	ND			ND	0.12	3.1	NA				NA		NA
Erco Blank	6007-10B (F1	ND	ND	ND	ND	0.12	3.1	NA				NA		NA
Erco Blank	6007-10B (FA	ND							ND	ND	0.5	11/16/87		NA
200EVB-1116876007-08 (F2)		ND			ND	0.12	3.1	NA				11/16/87		NA
200EVB-1116876007-08 (F1)		1400	ND	ND	ND	0.12	3.1	NA				11/16/87		NA
200EVB-1116876007-08 (FA)		ND							ND	ND	0.5	11/16/87		NA
200EVB-1116876007-09 (F2)		ND			ND	0.12	3.1	NA				11/16/87		NA
200EVB-1116876007-09 (F1)		ND	ND	ND	ND	0.12	3.1	NA				11/16/87		NA
200EVB-1116876007-09 (FA)		ND							ND	ND	0.5	11/16/87		NA
200EVB-1116876007-10 (F2)		ND			ND	0.12	3.1	NA				11/16/87		NA
200EVB-1116876007-10 (F1)		ND	ND	ND	ND	0.12	3.1	NA				11/16/87		NA
200EVB-1116876007-10 (FA)		ND							ND	ND	0.5	11/16/87		NA
200E-1002-01	6007-01R (F2)				ND	1	25	89				11/16/87	Reextract	NA
200E-1002-01	6007-01R (F1)			ND	ND	1	25	89				11/16/87	Reextract	NA
200E-1002-01	6007-01R (FA)							74	ND	ND	25	11/16/87	Reextract	NA
200E-1404-01	5950-10R (F2	ND			ND	1	25	87				11/13/87		NA
200E-1404-01	5950-10RR (F	ND	ND	ND	ND	1	25	87				11/13/87	Reextract	NA
200E-403-01	6007-07R (F1)				ND		25	96				11/16/87	Reextract	NA
200E-403-01	6007-07R (F2)			ND	ND	1	25	96				11/16/87	Reextract	NA
200E-403-01	6007-07R (FA)							96	ND	ND	25	11/16/87	Reextract	NA

AKH000824

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-3: Phase II Ground Water Data

	Informal ECRA Cleanup Guidelines	MW01-GW01	MW02-GW01	MW02-GW02	MW03-GW01	MW04-GW01	MW05-GW01	MW06-GW01	MW07-GW01	MW08-GW01	MW09-GW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50										
Beryllium	--										
Cadmium	10					16				13	
Chromium	50					113					
Copper	1000										
Lead	50	87				77			60		158
Mercury	2										
Nickel	--										
Selenium	10										
Thallium	--										
Zinc	5000										
Total Volatile Organics (ppb)	10										
Toluene											
Ethylbenzene											
Chloroform											
Total Petroleum Hydrocarbons	1000	1600	2400	1700							
Cyanide	200										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000825

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-3: Phase II Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW10-GW01	MW11-GW01	MW12-GW01	MW13-GW01	MW14-GW01	MW15-GW01	MW15-GW02	MW16-GW01	MW17-GW01	MW18-GW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50								86		
Beryllium	--										
Cadmium	10								22	15	
Chromium	50								319	100	
Copper	1000								3760		
Lead	50	217			281	197	603	829	9450	249	179
Mercury	2							2	23	6	
Nickel	--										
Selenium	10										
Thallium	--										
Zinc	5000								8220		
Total Volatile Organics (ppb)	10	11000			110						
Toluene		11000									
Ethylbenzene					110						
Chloroform											
Total Petroleum Hydrocarbons	1000										
Cyanide	200										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH0000826

945990625

F[illegible]000966

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-3: Phase II Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW19-GW01	MW21-GW01	MW22-GW01	MW23-GW01	MW24-GW01	MW25-GW01	MW25-GW02	MW26-GW01
Priority Pollutant Metals									
Antimony	--								
Arsenic	50	91							
Beryllium	--								
Cadmium	10	29							
Chromium	50	209							
Copper	1000								
Lead	50	939		69					
Mercury	2	5							
Nickel	--								
Selenium	10								
Thallium	--								
Zinc	5000								
Total Volatile Organics (ppb)	10								
Toluene									
Ethylbenzene									
Chloroform									5
Total Petroleum Hydrocarbons	1000								1100
Cyanide	200								

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000827

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-4: March 1988 Ground Water Data

	Informal ECRA Cleanup Guidelines	MW01-GW01	MW01-FW01	MW02-GW01	MW02-FW01	MW03-GW01	MW03-FW01	MW04-GW01	MW04-FW01	MW05-GW01	MW05-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50							950			
Beryllium	--										
Cadmium	10							2430			
Chromium	50							2760			
Copper	1000							2950			
Lead	50					83		3950			
Mercury	2							25			
Nickel	--										
Selenium	10							45	14		
Thallium	--										
Zinc	5000							44900			
Total Volatile Organics	10										
Toluene											
Ethylbenzene											
Benzene											
Total Petroleum Hydrocarbons	1000	1000									

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000828

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW06-GW01	MW06-FW01	MW07-GW01	MW07-FW01	MW08-GW01	MW08-FW01	MW09-GW01	MW09-FW01	MW10-GW01	MW10-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50										
Beryllium	--										
Cadmium	10					12					
Chromium	50					60					
Copper	1000										
Lead	50	91				397		68		1790	
Mercury	2				3.2					5	
Nickel	--										
Selenium	10			26	26	18	17				
Thallium	--										
Zinc	5000										
Total Volatile Organics	10			62						17115	
Toluene				18						17000	
Ethylbenzene				36						110	
Benzene				8						5	
Total Petroleum Hydrocarbons	1000										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000829

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW11-GW01	MW11-FW01	MW12-GW01	MW12-FW01	MW13-GW01	MW13-FW01	MW14-GW01	MW14-FW01	MW15-GW01	MW15-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50										
Beryllium	--										
Cadmium	10										
Chromium	50										
Copper	1000										
Lead	50					90				299	
Mercury	2										
Nickel	--										
Selenium	10				15						
Thallium	--										
Zinc	5000										
Total Volatile Organics	10	95				93					
Toluene		40									
Ethylbenzene		42				93					
Benzene		13									
Total Petroleum Hydrocarbons	1000										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH000830

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW16-GW01	MW16-FW01	MW17-GW01	MW17-FW01	MW18-GW01	MW18-FW01	MW19-GW01	MW19-FW01	MW22-GW01	MW22-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50	85		63							
Beryllium	--										
Cadmium	10			26						13	
Chromium	50	92		266							
Copper	1000			1130							
Lead	50	2320	84	1760		97		75			
Mercury	2	5.6		22							
Nickel	--										
Selenium	10	11		48	42			41	44	25	30
Thallium	--										
Zinc	5000	8220									
Total Volatile Organics	10										
Toluene											
Ethylbenzene											
Benzene											
Total Petroleum Hydrocarbons	1000										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table 6-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW26-GW01	PC01-SW01	PC01-SW11	PC01-FW01	PC01-FW11	NB01-SW01	NB01-FW01
Priority Pollutant Metals								
Antimony	--							
Arsenic	50							
Beryllium	--							
Cadmium	10							
Chromium	50							
Copper	1000							
Lead	50							
Mercury	2							
Nickel	--							
Selenium	10						38	31
Thallium	--							
Zinc	5000							
Total Volatile Organics	10							
Toluene								
Ethylbenzene								
Benzene								
Total Petroleum Hydrocarbons	1000							

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

AKH0000832

AKH000833

945990632

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX H

Description of Solute Transport Modeling Analyses

I. INTRODUCTION

This appendix presents a description of the modeling analysis performed to evaluate the potential migration of VOC contamination in the shallow aquifer. This information was used in determining the need for additional investigation and/or remediation of shallow ground water. The analyses were based on hydrogeologic and analytical data collected between November 1986 and March 1988.

Visual inspection of piezometric surface data shown in Figures III-1 through III-7 suggests that the general direction of ground water flow at the site is to the northeast towards the underground flume which discharges into Newark Bay. The ground water flow path emanating from the location where the highest levels of VOCs, particularly toluene, were noted (i.e., MW10) is towards monitoring well MW4 located immediately adjacent to the underground flume. While high levels of toluene (i.e., 11 to 34 parts per million) were detected at MW10 during the aforementioned sampling period, toluene has not been detected at downgradient monitoring well MW4 during this period of time. Therefore, the primary objective of this modeling analysis was to simulate potential contaminant levels of toluene in the vicinity of the underground flume (e.g., MW4) and their levels at the nearest discharge point into Newark Bay, in relation to the contributing source at MW10.

II. DESCRIPTION OF SOLUTE TRANSPORT MODEL

In general, modeling of contaminant transport through an aquifer system is mathematically complex and requires a thorough understanding of the flow characteristics as well as the chemical and physical processes (*e.g.*, degradation, adsorption, etc.) affecting contaminant migration via ground water. In addition, detailed information describing the source of contamination and its variation with respect to time and space is of primary importance in formulating the model simulation.

The model selected for this study was a two-dimensional analytical contaminant transport model, referred to as "Plume", developed by In-Situ Inc., Laramie, Wyoming (1985). The model is capable of incorporating both the physical and chemical behaviors of toluene during the transport process. The model has been widely used by other investigators in simulating the migration of toluene and other VOCs in an aquifer system (Griffin, 1986).

The basic application of the model is to predict or simulate the historical development of ground water contamination by imposing accurate descriptions of the flow characteristics and the nature of contaminant release. Specifically, the model can simulate the temporal variation of ground water contamination at any location within the flow region taking into account: (1) ground water flow velocity; (2) site-specific aquifer characteristics; (3) the location and size of the contaminant source area; (4) the strength of the contaminant source; and (5) the time frame of the contaminant release. The hydrogeologic parameters that must be specified to represent the aquifer characteristics include dispersion coefficients, saturated depth and porosity of the aquifer. Simplifying assumptions adopted in the analytical model are as follows:

- Ground water flow velocity within the modeled flow region is constant along the longitudinal axis (e.g., uniform velocity).

- Saturated depth of the aquifer is uniform throughout the flow region.

- Contaminant concentration derived from the model represents an average concentration over the entire saturated depth.

- Dispersion only occurs in the x-y plane. This assumption is quite satisfactory for this site where the saturated depth of the shallow aquifer is less than three meters.

The partial differential equation employed in the analytical solute transport model is given below.

$$\frac{\delta C}{\delta t} = V_i \frac{\delta C}{\delta X_i} + D_{ij} \frac{\delta^2 C}{\delta X_i \, \delta X_j} - R_x \qquad \text{(Eqn. H1)}$$

where:

C = concentration $[M/L^3]$

t = time $[T]$

V_i = mean value of ith component of ground water flow velocity $[L/T]$

$X_i X_j$ = cartesian coordinates $[L]$

D_{ij} = i, j component of hydrodynamic dispersion tensor $[L^2/T]$

R_x = rate of conversion or adsorption of solute

The solution for a continuous but biodegrading contaminant source given by In-Situ, Inc. (1985) is as follows.

$$C\ (X,Y,t) = \frac{C_o}{4} \int_o^t \exp\ (-0.693\ \tau/t_{1/2}\ )$$

$$\bullet\ [\text{erf}\ (\frac{X + X_o/2 - V_x\ (t-\tau)/R}{(4D_x\ (t-\tau)/R)^{1/2}}) - \text{erf}\ (\frac{X - X_o/2 - V_x\ (t-\tau)/R}{(4D_x\ (t-\tau)/R)^{1/2}})\ ]$$

$$\bullet\ [\text{erf}\ (\frac{Y + Y_o/2 - V_x\ (t-\tau)/R}{(4D_y\ (t-\tau)/R)^{1/2}}) - \text{erf}\ (\frac{Y - Y_o/2 - V_y\ (t-\tau)/R}{(4D_y\ (t-\tau)/R)^{1/2}})\ ]\ d\tau \qquad \text{(Eqn. H2)}$$

where:

C_o = initial concentration of the contaminant at the source

$t_{½}$ = half-life for the biodegradation conversion of the contaminant source

τ = integration parameter

The solution given in Equation H2 reflects an "as-is" condition of the contaminant source at the site. Specifically, the assumption of Equation H2 is that the VOC source present in soils is not treated and/or eliminated, although the source will undergo a continuing reduction by biodegradation. Modeling analysis performed herein is based on the above solution given in Equation H2.

III. INPUT PARAMETERS

A. Chemical Data

Toluene undergoes attenuation during the transport process in the subsurface environment by means of retardation and biodegradation. The retardation is mainly due to a physical-chemical process known as "adsorption". Toluene molecules tend to concentrate at solid-liquid interfaces of the porous media. Therefore, the migration of toluene along with ground water flow is retarded due to this mechanism. The retardation of a particular chemical is dependent on the organic content (foc) of the aquifer material and the partition coefficient (koc) of the chemical. The koc value of toluene used in the analyses was 300 cm^3/g (USEPA, 1985). An assumed foc value of 0.5 percent was used for this site. The basis for this assumption is that a typical range of foc values for the types of soil encountered at this site (e.g., sandy-silty soils) is 0.1 to 1 percent.

Attenuation by biodegradation is caused by microorganisms which break down organic substances. The rate of degradation is generally indicated by the parameter known as the rate constant (K). The rate constant for toluene was determined to be 4.7×10^{-4} day^{-1} (Wilson, Smith and Rees, 1986). This value is equivalent to the half-life value of 4.04 years. This means that every 4.04 years the source strength of toluene will be reduced to half of the original.

B. Aquifer Data

The ground water model requires evaluation of a number of input variables relative to the aquifer. Much of the aquifer data such as ground water flow velocity and saturated depth can be determined utilizing site-specific data. Other required information, including effective porosity and dispersivity values, are typically estimated. A summary of the aquifer data employed for the modeling analysis is provided in Table H-1. A discussion of the determination of ground water flow velocity is presented below.

There are no site-specific hydraulic conductivity data available for the calculation of ground water flow velocity. One way of obtaining the flow velocity is to use a typical range of hydraulic conductivity values for the type of soils encountered at this site (e.g., 10^{-4} to 10^{-3} cm/s for sandy-silty soils). This information, along with hydraulic gradient and effective porosity values, can be used in the Darcy flow equation to calculate ground water flow velocity. The highest hydraulic gradient along the flow path from MW10 to MW4, based on the April 29, 1988 water level data shown in Figure III-7, was 0.0115 ft/ft. Therefore, the calculated flow velocity (V) corresponding to the above hydraulic gradient (i), assumed hydraulic conductivity (k) of 10^{-3} cm/s and an effective porosity (n_e) value of 0.1, is approximately 120 feet per year, where:

$$V = k \bullet i/n_e$$
$$= (10^{-3}\ cm/s)(0.0115\ ft/ft)/0.1$$
$$\cong 120\ ft/yr$$

Table H-1: Summary of Aquifer Data

Parameters	Estimated Values
Ground Water Flow Velocity (e.g., Darcy velocity)	171 ft/yr(1)
Longitudinal Dispersivity	10 ft(2)
Transverse Dispersivity	1 ft(2)
Effective Porosity	0.10(2)
Saturated Depth	8.5 ft(3)
Grain Density of Aquifer Material	2.65 g/cm^3(3)

Source: (1) Estimation based on site-specific data.

(2) Typical values for sandy-silty soils given by Yeh (1981).

(3) Obtained from the site's boring logs.

While a significant level of toluene was detected at MW10 in November, 1986, the most recent samples taken from a downgradient well (MW4) in March 1988 revealed that it was free of toluene. MW4 is located approximately 225 feet from MW10. This implies that the flow velocity along this path must be less than 171 feet per year. A higher toluene concentration would result at the downgradient well (MW4) if in fact the higher flow velocity (171 ft/day) were correct. This would be due primarily to less time allowed for the biodegradation process. Therefore, the upper limit flow velocity of 171 ft/yr was chosen for the modeling analysis to provide an added margin of conservatism.

C. Contaminant Source Data

An examination of toluene concentrations in and around the source location (MW10) suggests that the areal extent of the toluene source is likely to be relatively small (i.e., a localized point source). For example, 17,000 ppb of toluene were detected from MW10 during the latest sampling round in March 1988. Two downgradient monitoring wells (MW14 and MW15), located within a 100 foot radius, did not exhibit any toluene contamination. Based on these data, the size of the toluene source in the vicinity of MW10 was estimated to be 50 ft. by 50 ft. The entire source area was assumed to be contaminated to a level of 17,000 ppb. It is believed that this estimation of the toluene source is highly conservative.

IV. MODEL SIMULATION AND RESULTS

All of the input data described in the previous section were incorporated into the transport model. A simulation was run to predict toluene concentrations at MW4 as a function of time.

The simulated toluene concentration levels at MW4 from years 1988 to 2034 are listed in Table H-2. The results indicate that the maximum level of toluene (23.2 ppb) will be observed in the year 2018, which is significantly lower than the initial source concentration of 17,000 ppb detected in MW10. The maximum concentration of toluene (23.2 ppb) will be reduced further to a non-detectable level as a result of mixing when discharged into the underground flume. A preliminary flow analysis around the flume indicates that dilution is expected to result in an approximate 60-fold reduction. Therefore, toluene concentrations at the nearest discharge point into Newark Bay will be on the order of 0.4 ppb, which is below the informal ECRA cleanup guideline of 10 ppb. This level poses no risk to public health or the environment.

Table H-2: Simulated Toluene Concentrations at MW4

Time (yr)	Concentration in (ppb)	
1988	0.0	
1989	0.0	
1990	0.0	
1991	0.0	
1992	0.0	
1993	0.0	
1994	0.0	
1995	0.0	
1996	0.0	
1997	0.003	
1998	0.03	
1999	0.10	
2000	0.23	
2001	0.50	
2002	0.90	
2003	1.53	
2004	2.42	
2005	3.59	
2006	5.04	
2007	6.74	
2008	8.65	
2009	10.7	
2010	12.8	
2011	14.9	
2012	16.9	
2013	18.7	
2014	20.2	
2015	21.5	
2016	22.4	
2017	23.0	
2018	23.2	maximum
2019	23.2	
2020	22.9	
2021	22.3	
2022	21.5	
2023	20.5	
2024	19.4	
2025	18.2	
2026	17.0	
2027	15.7	
2028	14.4	
2029	13.2	
2030	12.0	
2031	10.8	
2032	9.93	
2033	8.71	
2034	7.76	

REFERENCES

Environmental Protection Agency. 1985. Water Quality Assessment: Screening for Toxic and Conventional Pollutants in Surface and Ground Water. Part I. 1985.

Griffin, R.A. and W.R. Ropy. 1986. *Feasibility of Land Disposal of* Organic Solvents: Preliminary Assessments, Illinois State Geological Survey, Champaign, Illinois.

In-Situ, Inc. 1985. Computer Technology Division. Ground Water Hydrology. Laramie, Wyoming.

Wilson, B.H., G.B. Smith, and S.F. Rees. 1986. Biotransformation of Selected Alkylbenzenes and Halogenated Aliphatic Hydrocarbons in Methanogenic Aquifer Material: A Microcosm Study, Environmental Science Technology, Vol. 20, No. 10, p. 997.

Yeh, G.T. 1981. AT123D: Analytical transient one-, two-, and three-dimensional simulation of waste transport in an aquifer system. ORNL-5602. Oak Ridge National Laboratory. Oak Ridge, Tennessee.

AKH000847

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX I

Plates

AKH000848

945990647

16

Julia
Mimeltoin

Presentation of
Additional ECRA Sampling Results and
Revised Cleanup Plan for the
Spencer Kellogg Facility
Formerly a Division of Textron Inc.
400 Doremus Avenue
Newark, Essex County, New Jersey

ECRA Case No. 85403

Volume I of IV

Prepared for

Textron Inc.
Providence, Rhode Island 02903

Prepared by

ENVIRON® Corporation
Princeton, New Jersey 08540

October 1990

AKH000849

945990649

CONTENTS

CONTENTS

LIST OF TABLES

CONTENTS

TABLES (continued

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES

I. INTRODUCTION

A. Purpose and Scope

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA) which provided for Textron's compliance with ECRA after the sale of its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg facility or the site) to NL Industries, Inc. To assist Textron in complying with ECRA, ENVIRON implemented a New Jersey Department of Environmental Protection (NJDEP)-approved Phase I Sampling Plan from November 1986 to March 1987. ENVIRON submitted the results of that investigation to NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and presented the results to NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

Results of the Phase I Sampling Plan indicated the presence of soil and ground water contamination[1] at the Spencer Kellogg facility. ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987 to define more fully the nature and areal extent of both soil and ground water contamination in certain areas of the site, to characterize ground water flow patterns, and to clarify other issues that were not resolved during the first phase of sampling. ENVIRON provided the results to NJDEP in June 1988 in a report entitled "Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan."

Based on the results of the Phase I and Phase II sampling programs and consideration of informal NJDEP ECRA guidelines, ENVIRON and Textron concluded that the unsaturated soils in certain areas of the site required remediation due to the presence of volatile organic compounds (VOCs). The occurrence of VOCs in these areas seemed likely related to known on-site industrial operations. Additionally, these constituents were found in the shallow ground water in limited areas of the site. Initially, in situ bioremediation was considered as a cleanup remedy. Bench-scale laboratory testing and field studies were conducted to evaluate this innovative technology. The results of this work and a formal proposal for in situ bioremediation were provided to NJDEP in the January 17, 1990 Cleanup Plan for the Spencer Kellogg facility.

---

1 For the Phase I and II results reports, contamination was defined as concentrations of a particular substance exceeding informal NJDEP ECRA action levels for soil or ground water.

In its April 3, 1990 letter responding to the January 1990 Cleanup Plan, NJDEP concluded that while in situ bioremediation would be acceptable, there was insufficient data to approve the proposed Cleanup Plan. In that letter, NJDEP requested further characterization sampling for base/neutral compounds (BNs) in certain areas already targeted for cleanup (target areas) and in certain additional areas where no further action had been proposed (non-target areas). NJDEP also requested additional delineation sampling for VOCs in those areas already targeted for remediation. In a June 26, 1990 letter to NJDEP, ENVIRON set forth a proposed scope of sampling in both target and non-target areas. NJDEP approved some of this work in its July 20, 1990 letter to Textron, and the remainder was subsequently approved as set forth in ENVIRON's August 1, 1990 letter to NJDEP. This additional ECRA sampling was conducted during July and August 1990.

In this report, ENVIRON provides a brief summary of the Phase I and Phase II analytical results, presents and evaluates the results of the additional ECRA sampling, and provides a revised Cleanup Plan. The revised Cleanup Plan consists of a conceptual design for cleanup of contaminated soils using low-temperature volatilization and a discussion of additional tasks that must be completed prior to implementing cleanup. A final work plan will be developed and permitting will be initiated after NJDEP approval of the revised Cleanup Plan. The proposal to use low-temperature volatilization rather than in situ bioremediation results from the uncertainty as to whether bioremediation can effectively degrade VOCs and BNs to required levels and the extended length of time that would be required to complete remediation using biodegradation.

The revised Cleanup Plan consists of the following components:

- A discussion of overall cleanup objectives;
- A sampling plan to complete delineation of target areas;
- A description of the cleanup technology proposed for the site;
- A schedule for Cleanup Plan implementation; and
- A cost estimate for the proposed cleanup activities.

The cleanup objectives are defined as remediation of VOCs and BNs in soils to levels below site-specific cleanup criteria. The technology selected is low-temperature volatilization. The proposed additional sampling plan is designed to: (1) confirm the bounds of VOC contamination in target areas; (2) ensure that lead and arsenic levels in soils in certain locations are not materially different from those previously measured; and (3) confirm that BNs in one location are limited in their areal extent.

The schedule provides an estimate of the time required to prepare for implementation and to implement the Cleanup Plan, and is based on the assumption that NJDEP approval will be received by December 31, 1990. The estimated costs are based on detailed discussions with qualified contractors capable of performing the proposed cleanup actions. If necessary, the schedule and/or cost estimate will be modified as part of the final remedial work plan to reflect any changes that may result from further discussions with qualified contractors and current plant personnel[2] regarding scheduling, from an evaluation of the results of delineation sampling or from actual contractor quotes for the proposed work.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site, approximately 10 acres in area, is directly across from Kearny Point, which marks the confluence of the Passaic and Hackensack Rivers, where these rivers join to form Newark Bay. Originally marshland, the site was filled in by the early 1900s and has since been used for industrial activity.

Plate 1 depicts the main features of the site. A breakwall consisting of concrete-covered rip rap is located along the eastern property edge adjacent to Newark Bay. West of the property is a landfill which drains into Plum Creek. Upon leaving the landfill, Plum Creek enters an underground conduit or flume, through which it flows under Doremus Avenue and beneath the site. This flume discharges from a pipe in the breakwall directly into Newark Bay.

According to plant personnel, the site has been used as a manufacturing facility since the first or second decade of this century. Before that time, the site housed an alcohol distillery. Resins and resin-related products have been manufactured on-site from the early 1930s to the present. For the past several decades, the facility has manufactured coating resins used primarily in the paint industry. The site has been almost entirely paved for the last few decades.

[2] The current owner/operator of the site is Reichhold Chemicals, Inc., which acquired the site from NL Industries, Inc. in 1989. Anticipated cleanup activities are being coordinated with Reichhold personnel.

C. Summary of Previous Sampling Activities, Environmental Concerns and Recommended Actions

Based on a series of initial site visits and a review of past and present operations, 27 areas of environmental concern (AECs) were identified. The rationale for selection of each AEC is provided in Table 1, and the locations are illustrated on Plate 1. To evaluate the effect of past site activities on the quality of soil and ground water and to determine the geologic and hydrogeologic characteristics of the site, ENVIRON completed 46 soil borings and installed 11 shallow and 3 deep monitoring wells during execution of the Phase I Sampling Plan, primarily within the aforementioned AECs. The shallow wells were installed to monitor the fill unit, which extends to a depth of approximately 10 feet below grade. The deep wells monitor a sandy aquifer encountered between 30 and 40 feet below grade. Separating the water-bearing units is a 20-foot clay, silt and peat layer. Soil, surface water and ground water samples were collected and analyzed for those chemicals that were potentially present due to industrial activities within the AECs.

The Phase I Sampling Plan results indicated that the primary constituents in soil at the site are total petroleum hydrocarbons (TPHCs) and VOCs, particularly ethylbenzene, toluene and xylenes. Priority pollutant metals (PPMs), BNs and other VOCs, such as benzene, methylene chloride and chloroform, were detected in only a few soil samples.

The primary ground water contaminants detected at the site during Phase I sampling were ethylbenzene and toluene. PPMs were detected above informal ECRA action levels in two of the five wells tested for metals. TPHCs, benzene and cyanide were each detected in only one ground water sample. Trace levels of VOCs were observed in one deep monitoring well. No other constituents of concern were detected at concentrations above informal ECRA action levels in ground water or soil samples collected during the Phase I sampling program.

To provide a more comprehensive data base required for determining the need for and possible nature and extent of soil and ground water remediation, ENVIRON collected 42 additional soil samples and installed 11 additional shallow and deep monitoring wells during execution of the Phase II Sampling Plan. The primary objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) identify the specific hydrocarbons that contribute to the TPHC contamination in each AEC; and (3) further characterize the nature of metal contamination.

The results of the Phase II Sampling Plan indicated that PPMs were present at random locations over broad areas of the site and confirmed that a significant quantity of TPHCs detected previously are nonhazardous fish and vegetable oils. The data also indicated that

TABLE 1

Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of possible discharge onto unpaved region from dumpster and compactor that receive waste from Buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of possible discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of possible discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of potential discharge of raw materials and finished products from the polyester resin manufacturing process through a hole in the building's floor.
10	Site of finished product and raw materials storage while area was unpaved.
11	Former aboveground storage tank located in unpaved area.

TABLE 1 (continued)
Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
12	Building on stilts with potential for spills or discharges beneath.
13	Site of former aboveground storage tanks while area was unpaved.
14	Site of former aboveground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with evidence of spills.
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former aboveground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix has been stored in drums.
23	Tank wagon loading area for Building 4 where 1285 Premix may be generated.
25	Tank wagon loading area for Building 26 where 1285 Premix may be generated.

TABLE 1 (continued)
Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
26	Drains in large tank farm which may have discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, NJDEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, NJDEP site inspection).

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

288E:PAA00420.W51

petroleum-based hydrocarbons, such as fuel oils, lubricating oils and gasoline, are present at levels below those (i.e., < 15,000 ppm) that would require remedial action at this site.[3]

Phase II ground water quality data were similar to those obtained during Phase I ground water sampling. VOCs were present in localized areas of the site, but were not detected in Phase II wells installed in downgradient areas. In addition, only two dissolved PPMs were detected and TPHCs were present only in the two background wells. No significant levels of contaminants were detected in the deep aquifer.

Provided below is a brief discussion of the results of both sampling programs in terms of the probable source(s) of each constituent group (VOCs, TPHCs and PPMs) and the potential need for remediation of soils and ground water. While BN or polycyclic aromatic hydrocarbon (PAH) analyses were performed during Phase I sampling, NJDEP requested significant additional sampling and analysis after the Phase I and II sampling programs were completed. The results of that work are described in Section III, along with an interpretation of all BN data as they relate to remedial needs. Limited additional analyses were performed for VOCs as well, the results of which do not change the conclusions presented below. The results of these analyses are presented in Section III.

1. **Soil Contamination Related in Whole or in Part to On-Site Industrial Activities**

VOCs, particularly ethylbenzene, toluene and xylenes, appear to have been the result of historical industrial operations and activities at the facility. The occurrence and relative concentrations of these compounds are generally consistent with known and possible uses within certain AECs. The distribution and concentrations of VOCs detected during the Phase I sampling are provided on Plate 2.

The results of Phase I and II sampling provided adequate definition of the lateral and vertical extent of VOCs in soils for estimating the potential scope of remediation. Given that past on-site industrial operations are the likely source of these materials and that VOCs are present in shallow ground water, remediation of VOCs in soils is proposed.

TPHCs are also present in the soils of the fill material on-site. Like VOCs, the past use and handling of raw materials, products and wastes appear to have contributed

---

3 During a meeting among Textron, ENVIRON and NJDEP on September 10, 1990, the agency indicated that 15,000 pm of TPHCs would be used as a standard to trigger cleanup provided that carcinogenic and noncarcinogenic BNs are not present above 10 and 100 ppm, respectively.

to the levels of TPHCs found in soil. However, unlike VOCs, some of the TPHC contamination noted appears to be fill-related.

Results of hydrocarbon "fingerprinting" analyses performed as part of the Phase II Sampling Plan indicated that a significant portion of the TPHCs detected are nonhazardous fish and vegetable oils. The non-petroleum-based fractions typically were identified as either soybean oil or linseed oil. The petroleum hydrocarbon fractions were qualitatively identified by their gas chromatographic characteristics as paint thinner, fuel oils, lubricating oils, gasoline, kerosene, coal tar, and PAHs. The results of these analyses are provided on Plate 3.

The presence of non-petroleum-based hydrocarbons such as soybean or linseed oil is not of concern and does not warrant remedial attention.[4] In contrast, Textron and ENVIRON understand that the presence of petroleum-based products would be of concern to NJDEP if the levels measured exceeded 15,000 ppm. None of the soil samples analyzed exceeded 15,000 ppm of petroleum hydrocarbons. Therefore, the presence of TPHCs is not a factor in planning the remediation at this site. However, as discussed in Section III, BNs will be used to determine the remedial requirements in areas containing TPHCs.

The occurrence of PAHs or total BNs in soils in some areas of the site may be related to the past release of petroleum hydrocarbons, although the detection of these compounds in areas where no apparent on-site source exists suggests that they may also be associated with the fill. Total BNs or PAHs were analyzed for during the Phase I sampling program. Additional PAH and total BN data were recently collected, and the results of all PAH/BN sampling are presented and discussed in Section III.

2. Soil Contamination Related Solely to On-Site Fill Materials

Several species of metals were found at background locations and in samples from locations within the central and eastern portions of the site (Plates 4 and 5). However, their presence is believed to be associated with on-site fill materials rather than past industrial activities because none of the metals detected is known to have been used during the operating history of the site in any way that would have resulted in the observed patterns of metal contamination. In addition, the variability of metal concentrations and noted increases of metal concentrations with depth at several sampling locations are indicative of heterogeneous fill material rather than the effect of

---

[4] NJDEP confirmed this position during a September 10, 1990 meeting among Textron, ENVIRON and NJDEP.

AKH000861

945990661

site operations. If the metals had been introduced into the soil by site activities, the higher concentrations would be expected in the near-surface soil samples. The occurrence of PPMs is generally limited to the central and eastern portions of the site, areas where distinct fill material exists. For these reasons, Textron recommended in its June 1988 report that any cleanup activity not include PPMs in soils.

In its January 30, 1989 and April 3, 1990 response letters to Textron, NJDEP concurred with Textron's position that the metal contamination is related to the fill material. However, NJDEP also indicated in its April 3, 1990 letter that a deed restriction likely would be required for the metals. During Textron's September 10, 1990 meeting with NJDEP to discuss this potential deed restriction, the agency indicated that, based on the levels of heavy metals detected to date at the site, neither remediation nor a deed restriction would be required. NJDEP expressed concern, however, about the levels of lead and arsenic detected in a few soil samples and requested that limited additional site characterization -- in the vicinity of soil samples with concentrations exceeding 1,000 ppm of lead and 20 ppm of arsenic -- be conducted as part of the approved Cleanup Plan. The purpose of this sampling will be to ensure that the levels of lead and arsenic measured at the limited additional sampling locations are not materially different from those previously obtained (e.g., that they are not 3 to 4 times greater than those previously detected). Unless the additional samples exhibit levels of lead or arsenic levels previously detected, NJDEP indicated that no remediation or deed restriction will be required. A proposal for the additional sampling for lead and arsenic is provided in Section IV of this report.

3. Shallow Ground Water

Despite the presence of TPHCs, PPMs, BNs and VOCs within the shallow soils of the fill material, little contamination has been detected in the shallow ground water. TPHCs at levels slightly above the informal ECRA action level are present only in the upgradient background wells (MWs 1 and 2) and are attributable to off-site sources. With one exception, the only dissolved PPM detected at concentrations above the informal ECRA action level is selenium, the source of which appears to be Newark Bay. BNs have never been detected in the ground water samples taken from the on-site monitoring wells. The analytical results of Phase I and Phase II ground water sampling are summarized on Plates 6 through 8.

VOCs detected in the shallow ground water for the most part seem to be related to contaminated on-site soils, but the impact appears to be limited in areal extent. VOCs have been detected in only 5 of 20 shallow wells (MW7, MW10, MW11, MW13, and

MW20). Toluene and/or ethylbenzene were generally the detected constituents of concern, although low levels of benzene and xylenes were occasionally reported. Except for MW10, the concentrations of total VOCs in the shallow ground water were relatively low. Based on the results of soil samples collected from MW10 and MW13 during well installation, it appears that the presence of VOCs in these wells is related to localized soil contamination. VOCs detected in MW20 are likely related to migration from MW10 or to nearby soil contamination. Low levels of VOCs detected in MW7 and MW11 could be related to migration from off-site sources of contamination.

As part of the Phase II Sampling Plan, mathematical analyses were performed to evaluate the potential migration of VOC contamination in the shallow aquifer. The results, presented in the June 1988 report, indicate that the concentration of VOCs at the nearest receptor boundary (Newark Bay) would be insignificant and would not pose a risk to public health or the environment. Consequently, ground water remediation was not proposed by Textron in the June 1988 report.

NJDEP indicated in its January 30, 1989 letter to Textron that the proposal not to remediate shallow ground water could not be accepted at that time because no actual soil remediation was proposed. Instead, NJDEP requested that Textron conduct quarterly ground water sampling from wells MW10, MW13, MW14, MW15 and MW20, and that this monitoring continue for a period of one year after source control/removal was implemented. NJDEP stated that the need for ground water remediation would be evaluated at that time. NJDEP restated this position in its more recent April 3, 1990 letter, and indicated that ground water cleanup may be required if soil remediation does not result in a sufficient decrease of ground water contaminants.

Textron continues to believe that shallow ground water remediation is not warranted for the reasons stated previously. The source of VOCs affecting the shallow ground water should be extensively reduced by the implementation of the low-temperature volatilization process discussed in Section IV. This should lead to a sufficient decrease in ground water contaminants to preclude the need for any ground water remediation.

Consistent with NJDEP's request, quarterly ground water sampling from the referenced wells began in April 1989, and all data have been provided to the agency as they have been acquired. A summary of the results of this sampling performed to date is provided in Appendix A. A full analysis of the results of quarterly sampling will be made after implementation of the Cleanup Plan for soils.

AK

4. Deep Ground Water

The analytical results of ground water samples collected from wells monitoring the deep aquifer indicated that the deep ground water beneath the site has not been affected by site activities. Lead, selenium and VOCs were detected at concentrations above the informal ECRA action levels in one monitoring well, but during only one of three sampling rounds. In addition, TPHCs at a concentration just slightly over the informal ECRA action level were detected in one other deep well during one sampling round. A number of factors likely caused the incidental detection of these compounds (field acidification of samples, tidal influence of Newark Bay, contamination during well installation, etc.), but none are linked to past industrial operations at the site. Therefore, no remedial action with respect to the deep aquifer is required, nor was any proposed to NJDEP in the June 1988 report or in the January 1990 Cleanup Plan. The agency did not take exception to this conclusion.

II. METHODOLOGY FOR ADDITIONAL ECRA SAMPLING

ENVIRON completed the additional ECRA sampling investigation at the Spencer Kellogg facility in general conformance with the scope of work set forth in ENVIRON's June 26 and August 1, 1990 letters and approved by NJDEP in its July 20, 1990 letter and July 30, 1990 telephone conversation with ENVIRON. All procedures and sampling techniques were consistent with the protocols outlined in NJDEP's Sampling Plan Guide and ENVIRON's Manual of Field Procedures. Some modifications to the sampling program were necessary due to certain conditions and restrictions encountered during field work. In addition, ENVIRON received agency approval to modify several requirements set forth in NJDEP's July 20, 1990 letter. These changes are described below.

A. Modifications to Sampling Program

1. Modifications Due to Field Conditions

The proposed sampling depths included the first 6-inch interval below the ground surface, 18 to 24 inches below the ground surface for VOCs only, and the 6-inch interval immediately above the water table.

Because of the high water table encountered at the site (usually between 2.5 and 3 feet below ground surface) and the presence of a gravel layer below the asphalt at many boring locations, the surface sample was within 1 foot of the water table at several locations. Thus, only one sample was collected at boring locations 1003, 1305, 1306, B-4 and B-6. Also, at several locations where sampling only for VOCs from the 18- to 24-inch interval was proposed, this sample coincided with the 6-inch interval immediately above the water table (for which both BN and VOC sampling was proposed). This occurred at borings 306, 1605, 2105, 2303, 2503, M1501 and M2401. Therefore, a single sample from the 18- to 24-inch interval at each of these locations was analyzed for BNs and VOCs. Additionally, split spoon recovery at some sampling locations was poor, making it difficult to determine the actual depth of the sample. In these instances, the sampling depth was recorded as the maximum depth range of the split spoon. This occurred at borings 1507 and B6.

Other modifications due to field conditions are listed below:

- Due to access difficulties, several borings that were proposed in ENVIRON's June 26, 1990 letter as hollow-stem auger borings were completed using hand augers instead. These borings included 502, 2802, B-1 and B-5.

- In AEC 26, samples for VOCs from borings 2601 and 2604 were taken from 12 to 14 inches rather than from 18 to 24 inches due to hand auger refusal at 14 inches.

- During field sampling activities, ENVIRON discovered that the area immediately south of the underground storage tank in AEC 6 is covered by a concrete pad. Therefore, boring 603 was completed adjacent to the southeastern corner of the underground storage tank.

2. Modifications to Conditions Set Forth in NJDEP's July 20, 1990 Approval Letter

Several modifications to the additional sampling requested by NJDEP in its July 20, 1990 conditional approval letter were agreed upon verbally by Mark Fisher, NJDEP Case Manager, during a July 30, 1990 telephone conversation with ENVIRON and confirmed in ENVIRON's August 1, 1990 letter. These modifications are summarized below.

- It was agreed that in AEC 8, previous Phase I sampling for PAHs met the objectives of the sampling requested by NJDEP in its July 20, 1990 letter. Therefore, additional sampling for BNs within this AEC was not required.

- ENVIRON clarified the fact that the soils removed from the concrete pad (AEC 22) were temporarily staged on asphalt. As a result, NJDEP agreed that additional soil sampling in the staging area would not be required.

- NJDEP's July 20, 1990 letter requested BN characterization sampling in all of the AECs previously targeted for remediation. Instead of discrete sampling in all of these AECs, BN characterization sampling was conducted in those areas where the results of petroleum hydrocarbon "fingerprinting" analyses, performed during the Phase II investigation, suggested the greatest potential for BNs. The areas sampled included AECs 3, 14, 16, 17, 21, 23, and 25. NJDEP agreed that this scope of work would satisfy the agency's requirements for additional characterization sampling in target areas.

- NJDEP agreed that delineation sampling for VOCs in target areas could take place as part of pre-remediation activities.

B. Soil Sampling Methods

Most of the soil borings were completed using a hollow-stem auger. Where access to a sampling location by a drill rig was limited, a hand auger was used for sample collection. All hollow-stem auger borings were plugged with a cement-bentonite grout mixture. All hand auger borings were plugged with cuttings from the borehole.

Soil samples were collected from hollow-stem auger borings using a split-spoon sampling device. Table 2 lists the sample locations, depths, and analyses performed on each sample. Boring depths were measured from the soil surface (not grade) to the base of the boring. In paved areas, the soil surface is covered with approximately 6 inches of gravel and asphalt. In unpaved areas, the soil is covered with up to 6 inches of gravel.

"Head-space" analysis was performed on soil samples from AEC 9 using an HNu meter. Volatile organics were not detected in any of the boring locations using this approach. All samples screened by "head space" analysis were submitted to the laboratory for confirmatory testing.

C. Quality Assurance/Quality Control Measures

1. Decontamination Procedures

The split spoons used to collect soil samples from hollow-stem auger borings were decontaminated by steam cleaning with potable water before the collection of each sample. The hand augers used to collect soil samples from the borings were decontaminated with an alconox-solution wash, a tap water rinse, and a final rinse with deionized water before the collection of each new sample. To avoid cross-contamination between samples, ENVIRON personnel used fresh gloves to collect each sample.

2. QA/QC Samples

To monitor the effectiveness of decontamination, ENVIRON collected at least one field (wash) blank from all sampling equipment used during each day of sampling. The wash blank was analyzed for all parameters for which samples collected on that day were analyzed, including BN+15, VOC+15 and xylenes.

TABLE 2
Sampling Locations, Collection Methods, Depths and Analyses

AEC	Boring	Sample Number	Collection Method[1]	Depth (feet)[2]	Analytical Parameters[3]
2	0202	288E-0202-SB01	HSAB	0.0-0.5	BN+15
	0202	288E-0202-SB02	HSAB	1.5-2.0	VOC+15, Xylenes
3	0306	288E-0306-SB01	HAB	0.0-0.5[4]	BN+15
	0306	288E-0306-SB02	HAB	1.5-2.0[4]	BN+15, VOC+15, Xylenes
5	0502	288E-0502-SB01	HAB	0.0-0.5[5]	BN+15
	0502	288E-0502-SB02	HAB	1.5-2.0[5]	VOC+15, Xylenes
6	0603	288E-0603-SB01	HSAB	0.0-0.5	BN+15
	0603	288E-0603-SB02	HSAB	1.5-2.0	VOC+15, Xylenes
	0603	288E-0603-SB03	HSAB	3.0-3.5	BN+15, VOC+15, Xylenes
9	0902	288E-0902-SB01	HAB	1.0-1.2	VOC+15, Xylenes
	0903	288E-0903-SB01	HAB	0.0-0.5	BN+15
	0903	288E-0903-SB02	HAB	0.5-0.8	VOC+15, Xylenes
	0904	288E-0904-SB01	HAB	0.0-0.5	BN+15
	0904	288E-0904-SB02	HAB	1.5-1.7	VOC+15, Xylenes
	0905	288E-0905-SB01	HAB	1.3-1.5	VOC+15, Xylenes
10	1003	288E-1003-SB01	HSAB	0.0-0.5[6]	BN+15
13	1305	288E-1305-SB01	HSAB	0.0-0.5	BN+15
	1306	288E-1306-SB01	HSAB	0.0-0.5	BN+15
14	1405	288E-1405-SB01	HSAB	0.0-0.5	BN+15
	1405	288E-1405-SB02	HSAB	1.5-2.0	BN+15
15	1506	288E-1506-SB01	HSAB	0.0-0.5	BN+15
	1506	288E-1506-SB03	HSAB	1.0-1.5	BN+15
	1507	288E-1507-SB01	HSAB	0.0-0.5	BN+15
	1507	288E-1507-SB03	HSAB	2.0-4.0[7]	BN+15
16	1605	288E-1605-SB01	HSAB	0.0-0.5	BN+15
	1605	288E-1605-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
	1605	288E-1605-SB22	HSAB	1.5-2.0	BN+15
17	1706	288E-1706-SB01	HSAB	0.0-0.5	BN+15
	1706	288E-1706-SB03	HSAB	1.5-2.0	BN+15

TABLE 2
Sampling Locations, Collection Methods, Depths and Analyses

AEC	Boring	Sample Number	Collection Method[1]	Depth (feet)[2]	Analytical Parameters[3]
	1707	288E-1707-SB01	HSAB	0.0-0.5	BN+15
	1707	288E-1707-SB03	HSAB	0.5-1.0	BN+15
	1707	288E-1707-SB11	HSAB	0.0-0.5	BN+15
	1707	288E-1707-SB33	HSAB	0.5-1.0	BN+15
	1708	288E-1708-SB01	HSAB	0.0-0.5	BN+15
	1708	288E-1708-SB03	HSAB	2.0-2.5	BN+15
	1708	288E-1708-SB11	HSAB	0.0-0.5	BN+15
	1709	288E-1709-SB01	HSAB	0.0-0.5	BN+15
	1709	288E-1709-SB03	HSAB	2.5-3.0	BN+15
	M240	288E-M2401-SB01	HSAB	0.0-0.5	BN+15
	M240	288E-M2401-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
	M240	288E-M2401-SB22	HSAB	1.5-2.0	VOC+15, Xylenes
18	1802	288E-1802-SB01	HSAB	0.0-0.5	BN+15
	1802	288E-1802-SB03	HSAB	2.0-2.5	BN+15
21	2105	288E-2105-SB01	HSAB	0.0-0.5	BN+15
	2105	288E-2105-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
23	2303	288E-2303-SB01	HSAB	0.0-0.5	BN+15
	2303	288E-2303-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
25	2503	288E-2503-SB01	HSAB	0.0-0.5	BN+15
	2503	288E-2503-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
26	2601	288E-2601-SB01	HAB	0.0-0.5	BN+15
	2601	288E-2601-SB02	HAB	1.0-1.2	VOC+15, Xylenes
	2602	288E-2602-SB01	HAB	0.2-0.5	BN+15
	2602	288E-2602-SB02	HAB	1.7-2.0	VOC+15, Xylenes
	2603	288E-2603-SB01	HAB	0.0-0.5	BN+15
	2603	288E-2603-SB02	HAB	1.5-2.0	VOC+15, Xylenes
	2604	288E-2604-SB01	HAB	0.0-0.5	BN+15
	2604	288E-2604-SB02	HAB	1.0-1.2	VOC+15, Xylenes
28	2802	288E-2802-SB01	HAB	0.0-0.5[8]	BN+15
	2802	288E-2802-SB11	HAB	0.0-0.5[8]	BN+15
	B-1	288E-B-1-SB01	HAB	0.0-0.5[5]	BN+15
	B-1	288E-B-1-SB02	HAB	1.5-2.0[5]	VOC+15, Xylenes
	B-1	288E-B-1-SB03	HAB	1.5-2.0	BN+15

AKH000869

945990669

TABLE 2
Sampling Locations, Collection Methods, Depths and Analyses

AEC	Boring	Sample Number	Collection Method[1]	Depth (feet)[2]	Analytical Parameters[3]
	B-2	288E-B-2-SB01	HSAB	0.0-0.5	BN+15
	B-2	288E-B-2-SB02	HSAB	2.0-3.0	BN+15
	B-2	288E-B-2-SB03	HSAB	3.0-3.5	BN+15
	B-3	288E-B-3-SB01	HSAB	0.0-0.5	BN+15
	B-3	288E-B-3-SB03	HSAB	2.0-2.5	BN+15
	B-4	288E-B-4-SB01	HSAB	0.0-0.5	BN+15
	B-5	288E-B-5-SB01	HAB	0.0-0.5	BN+15
	B-5	288E-B-5-SB03	HAB	1.0-1.5	BN+15
	B-5	288E-B-5-SB11	HAB	0.0-0.5	BN+15
	B-6	288E-B-6-SB01	HSAB	0.0-2.0[7]	BN+15
	M150	288E-M1501-SB01	HSAB	0.0-0.5	BN+15
	M150	288E-M1501-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes

1 Collection Method Abbreviations:
HAB - Hand Auger Boring
HSAB - Hollow-Stem Auger Boring

2 Depths are measured from the soil surface. The soil surface is covered with approximately 6 inches of gravel and asphalt, except where noted.

3 Analytical Parameter Abbreviations:
BN+15 - Priority Pollutant Base/Neutral Compounds plus 15 compound library search
VOC+15 - Priority Pollutant Volatile Organics plus 15 compound library search

4 The soil surface is covered with approximately 6 inches of gravel.

5 The soil surface is covered with approximately 2 inches of gravel.

6 The soil surface in AEC 10 is covered with approximately 6 inches of gravel and asphalt and a 6-inch concrete pad.

7 Due to poor recovery in the split spoon, it was not possible to determine the sampling interval. Therefore, the entire depth of the split spoon is considered to be the sampling interval.

8 The soil surface is covered with approximately 1 inch of gravel.

288E:PAA00420.W51

NET, the contracted laboratory, provided trip blanks to monitor possible contamination from sample handling, transport, and storage. A minimum of one trip blank accompanied the field crew for each day of sampling for VOCs, and was sent to the laboratory for VOC+15 and xylene analysis.

To evaluate quality control and the reproducibility of results, ENVIRON collected 1 duplicate per 20 samples. The duplicate soil sample for BN+15 analysis was collected by homogenizing a sample and then alternately filling the sample bottles of the duplicate pair. In the case of the VOC+15 and xylene duplicate, containers were filled prior to homogenization to minimize potential volatilization.

3. Documentation

Tier II data packages, including the original data and full laboratory documentation, are being submitted as attachments to this report in Volumes II, III, and IV. Several adjustments necessary to interpret the data effectively are described below.

- The collection of duplicate samples generates two sets of results for a given sampling location and depth. Assuming both samples were collected and analyzed correctly, both sets of results are considered valid. For this report, results of duplicate samples are presented individually rather than averaged.

- The unabridged data tables provided in Volumes II, III and IV of this report also present tentatively identified compounds (TICs), which are obtained from the forward library search associated with the BN and VOC priority pollutant scans. Reported with these chemicals are the estimated concentrations and retention times used by the laboratory for identification of compounds. The estimated concentrations are based on assumed response factors, and may vary from actual concentrations by as much as 500%. Because of the substantial uncertainty in the quantification of TIC concentrations, it is unreasonable to include these chemicals in any BN and VOC total. Thus, the TICs are not included in the summary table in Section IV. Their presence, however, is considered in attempting to understand qualitatively the nature and source(s) of contamination. Appendix C lists the TICs for each sample.

- If the letter "J" follows a reported concentration, that compound was not present above the minimum detection limit (which is based on the dilution of the extract). However, mass spectral data suggested its presence, and the reported concentration is an estimate. These values have been added to the tables provided by NET in the Tier II data packages (Volumes II through IV). ENVIRON has also provided these values in the summary tables of analytical results (see Appendix B).

- The data qualifier "B" following a value indicates that the compound was also detected in the method blank analyzed with that sample. The purpose of this qualifier is to warn that the quantification of a chemical has been affected by contamination in the analytical laboratory, as measured by the method blank.

D. Laboratory Procedures

All soil samples were analyzed by NET of Thorofare, New Jersey. NET is a state-certified laboratory (State Certification No. 08153). Table 3 lists the analytical method used for each parameter.

In a cooperative research effort with Tufts University, several duplicate samples were analyzed using a field-deployable, gas chromatograph-mass spectrometer (GC-MS). This device thermally desorbs organic compounds from soil followed by analysis by high resolution capillary column (DB-624 stationary phase) gas chromatography. The analytical results were used for preliminary evaluation of the field deployable GC-MS and are presented in Appendix D. No determination has been made by ENVIRON concerning the validity of the data.

PAA00420.W51

945990672

TABLE 3
Analytical Methods

Parameter	EPA Method	
	Water	Soil
Base/Neutral Compounds	625	625[1]
Volatile Organic Compounds	624	624[2]

1 Following extraction by EPA Method SW846:8270; samples were subject to matrix cleanup and alumina partitioning using EPA Methods 3650 and 3611, respectively, prior to BN+15 analysis.
2 Following extraction by EPA Method SW846:8240

288E:PAA00420.W51

III. RESULTS AND DISCUSSION OF ADDITIONAL ECRA SAMPLING

A. Introduction

1. General

This section of the report presents and discusses the analytical results of additional BN characterization sampling conducted at the Spencer Kellogg site. Results of VOC analysis performed on a limited number of samples from specific areas of the site are also provided. Data from earlier investigations for BNs or PAHs and VOCs are referenced where appropriate. The results are summarized for each tested AEC in Appendix B and are graphically presented on Plate 10. The unabridged summary tables and Tier II data packages appear in Volumes II through IV. Where applicable, these results and the quality assurance/quality control results are presented in terms of their relationship to site-specific informal ECRA action levels (hereinafter referred to as site-specific action levels), discussed during a meeting among NJDEP, Textron and ENVIRON on September 10, 1990. The site-specific action levels for these compounds are presented in Table 4. These criteria have been used to evaluate the levels of contaminants detected during this phase of sampling and the need for further investigation and/or cleanup.

The site-specific action levels for carcinogenic and noncarcinogenic BNs are 10 ppm and 100 ppm, respectively, consistent with current NJDEP guidelines. As indicated on Table 4, ENVIRON is using an action level of 10 ppm rather than 1 ppm for total VOCs. During the above-referenced meeting, NJDEP indicated that the higher standard of 10 ppm could be utilized at this site provided that benzene and chlorinated organics are not present and there is no impact to ground water or it can be demonstrated through modeling that no adverse impact on ground water will occur from such residual levels. Benzene and chlorinated organics have not been detected in on-site soils. Although ground water impact has occurred in limited areas of the site, the ground water modeling previously conducted by ENVIRON during the Phase II Sampling Plan indicated that the concentration of VOCs at the nearest receptor boundary (Newark Bay) would be insignificant and pose no risk to public health or the environment. The model utilized assumed no source control. With the source removal proposed in Section IV, impacts to ground water would be expected to substantially decrease over time. As a result, ENVIRON believes that all criteria have been met and that the 10 ppm standard for total VOCs is appropriate for this site.

TABLE 4
Site-Specific Informal ECRA Action Levels

Parameter	Soil
Base/Neutral Compounds (BNs)[1]	
Carcinogenic	10 ppm
Noncarcinogenic	100 ppm
Volatile Organic Compounds (VOCs)[2]	10 ppm

ppm: Parts per million (mg/kg)

1 The informal ECRA action level for BNs has been set by NJDEP for this case to reflect 10 ppm for carcinogenic BNs and 100 ppm for noncarcinogenic BNs. Carcinogenic BNs include:

benzo(a)anthracene	dibenzo(a,h)pyrene
benzo(b)fluoranthene	dibenzo(a,i)pyrene
benzo(j)fluoranthene	dibenzo(a,h)anthracene
benzo(k)fluoranthene	dibenzo(a,l)pyrene
benzo(a)pyrene	dibenzo(a,e)pyrene
chrysene	indeno(1,2,3-cd)pyrene

2 NJDEP has indicated that the informal ECRA action level for VOCs can be modified from 1 ppm to 10 ppm provided that: (1) benzene is not present; (2) chlorinated organics are not present; and (3) there is no impact to ground water or it can be demonstrated through modeling that no adverse impact on ground water will occur from such residual levels.

288E:PAA00420.W51

2. Rationale for Selection of Sampling Locations and Analyses

Most of the samples collected during this phase of sampling were taken from locations that had been sampled during previous site characterization studies. The earlier soil samples obtained from these locations were analyzed for VOCs and TPHCs. The sampling performed during this recent investigation was designed primarily to: (1) determine if significant BN levels exist at the site; and (2) evaluate the extent of VOCs in areas not previously tested for these compounds. Additional testing for VOCs was also performed in areas known to contain elevated VOC concentrations. More specific rationales for the selection of sampling locations and analyses are described below.

In its April 3, 1990 letter, NJDEP indicated that the results of petroleum hydrocarbon analyses suggested a potential BN problem at the site. During the September 10, 1990 meeting, the agency further indicated that TPHCs are used only as an indicator of potential contamination and that BN concentrations rather than TPHC concentrations are used to determine the need for remediation. As a result, NJDEP requested additional BN sampling.

To respond to the agency's concerns and request for additional sampling, ENVIRON collected soil samples for BN+15 analysis from locations where earlier TPHC results exceeded 500 ppm as determined by the "fingerprinting" analyses. These samples were collected from the first 6-inch soil interval below the soil surface (surface sample) and from an interval 0 to 6 inches above the water table (deeper sample). Matrix cleanup and alumina partitioning using EPA Methods 3650 and 3611, respectively, were performed on the samples prior to BN+15 analysis. As indicated by NJDEP in its April 3, 1990 letter, the BN data from areas not previously targeted for cleanup would be used to support a no further action approach or the need for additional investigation and/or cleanup. Data from BN characterization sampling, performed in areas previously targeted for cleanup due to the presence of elevated levels of VOCs, have been used in evaluating the applicability of potential remedial technologies.

As indicated above, NJDEP also requested additional sampling for VOCs. Specifically, the agency asked for VOC sampling from 18 to 24 inches below the soil surface in limited areas of the site. The purpose of this sampling was to: (1) examine the potential presence of VOCs in areas not previously investigated for these compounds (i.e., AECs 5 and 26); (2) delineate the horizontal extent of VOCs previously detected below the floor in Building 16; and (3) verify the absence of VOCs at depth in AEC 2 to support a no further action approach for this area. Additional samples for VOCs were also collected from several AECs previously targeted for cleanup as part of the proposed column testing associated with evaluating further in situ bioremediation as the cleanup remedy. As stated in Section I, Textron decided not to pursue this technology further and column testing was not performed.

Provided below is a brief summary of the results obtained from this sampling program as well as recommendations for future actions.

B. Quality Assurance/Quality Control Results

1. Method Blanks

One targeted BN, bis(2-ethylhexyl)phthalate, and one targeted VOC, methylene chloride, were detected in laboratory method blanks. Other BN and VOC compounds were also tentatively identified. Table 5 lists the compounds, the number of times each was detected, and the range of concentrations.

The highest concentration of bis(2-ethylhexyl)phthalate detected in a method blank was 2100 ppb. This compound was detected at similar concentrations in a number of soil samples and at lower concentrations in several wash blanks. Methylene chloride was detected in only one method blank at a concentration of 3 ppb, and was not detected in any soil samples. Nearly all of the BN TICs identified in the method blanks were also detected in some soil samples. The two VOC TICs, 2-butanone and vinyl acetate, were identified in two soil samples.

The presence of bis(2-ethylhexyl)phthalate is likely attributed to the plastic tubing used in the laboratory. Methylene chloride is a common laboratory contaminant which is used in the base/neutral extraction procedure. Some of the BN TICs, such as 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethane, are believed to result from the breakdown of methylene chloride during sonication per EPA method 3550 of SW846. NET, the analytical laboratory, believes that the presence of other BN TICs may be the result of laboratory contamination, although the exact cause is currently not known. The source of the VOC TICs is not known.

2. Trip Blanks

One trip blank accompanied the field crew each day of VOC sampling and was analyzed for VOC+15 including xylenes. Complete results for the trip blanks are presented in Volumes II through IV.

No targeted VOCs were detected in any of the three trip blanks. Two tentatively identified compounds, acetone and carbon disulfide, were detected. Acetone, a common laboratory contaminant, was present in each trip blank at concentrations

945990677

TABLE 5
Compounds Present in Laboratory Method Blanks

Compound	Number of Occurrences	Range of Concentrations (ppb)
Base/Neutral Compounds		
Bis-(2-Ethylhexyl)phthalate	2	220-2,100
1,1,2-Trichloroethane (TIC)	5	230-530
1,1,2,2-Tetrachloroethane (TIC)	4	470-1,100
5-Hexen-2-one (TIC)	2	8-200
1,3-Epoxy-4-methyl-pentane (TIC)	1	1,200
4-Hydroxy-2-propyl-2-Hexanone (TIC)	1	1,600
2-Propenylidene-Cyclobutene (TIC)	1	190
6-Bromo-2-hexanone (TIC)	2	200-260
2-Hexanone (TIC)	1	67
3-Hexanone (TIC)	3	52-1,600
2-Methyl-2-(1-methylethyl)oxyrane (TIC)	1	1,700
Methyl-benzene (TIC)	2	7-320
4-Methyl-2-pentanone (TIC)	2	11-270
3-Methyl-2-pentanone (TIC)	1	1,400
2,3-Dimethyl-2-Butanol (TIC)	1	6
2-Butanone (TIC)	1	62
Volatile Organic Compounds		
Methylene chloride	1	3
2-Butanone (TIC)	3	1,250-7,411
Vinyl acetate (TIC)	1	1,250

25 laboratory method blanks analyzed
TIC: Tentatively identified compound

288E:PAA00420.W51

945990678

ranging from 12 to 80 ppb. Carbon disulfide was detected only in the trip blank associated with the July 25, 1990 samples at a trace concentration of 2 ppb.

3. Field Blanks

One field (wash) blank was collected each day of sampling except on July 25, 1990, when two were collected. The wash blanks were analyzed for all chemical parameters which were sampled for on that day.

One targeted VOC, methylene chloride, and one targeted BN, bis(2-ethylhexyl) phthalate, were detected in one or more of the field blanks. No tentatively identified VOCs were detected, but several BN TICs were detected in trace quantities.

Methylene chloride was detected in two of the four field blanks analyzed for VOC+15. Methylene chloride is used in the laboratory sample extraction procedure for BN compounds, and its presence is likely the result of laboratory contamination. Two of the five field blanks analyzed for BN+15 contained trace concentrations of bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate is a common laboratory contaminant which can result from contact with latex gloves or laboratory tubing. This compound was also detected in two method blanks.

Four of the six field blanks contained a number of BN TICs. The "unknown" dimethylsiloxanes are likely attributed to laboratory contamination from the "bleeding" of the gas chromatography column. Most of the remaining BN TICs were detected at equal or higher concentrations in the soil samples. Many of these were also detected in the laboratory method blanks. Therefore, the BN TICs may be the result of incomplete decontamination of the field sampling equipment and/or laboratory contamination.

4. Duplicate Samples

Seven duplicate soil samples were collected. Six were analyzed for BN+15 and one for VOC+15 including xylenes. Table 6 provides a comparison of the analytical results for each duplicate sample. All duplicate sample results appear to fall within an acceptable range except for the duplicate sample from boring B-5. This sample contained total BN concentrations of 19.2 and 459.1 ppm. As a result, boring B-5 will be resampled as described in Section IV.

TABLE 6
Concentrations of Duplicate Sample Analyses

Sample Location	Depth	Matrix	Analysis	Conc. 1	Conc. 2
1605	1.5-2.0	Soil	BN+15	23.9	17.2
1707	0.0-0.5	Soil	BN+15	57.1	11.1
	0.5-1.0	Soil	BN+15	0.7	6.8
1708	0.0-0.5	Soil	BN+15	1.77	0.95
M2401	1.5-2.0	Soil	VOC+15 including xylenes	0.04	0.10
2802	0.0-0.5	Soil	BN+15	61.9	20.6
B-5	0.0-0.5	Soil	BN+15	19.2	459.1

Notes:

Depths are in feet below the soil surface.
Concentrations are reported in parts per million (ppm).

288E:PAA00420.W51

C. Soil Results in Areas Previously Targeted for Cleanup

1. AEC 3: Finished Product Loading Area

Two samples were collected from boring 306 during this phase of additional sampling. The surface sample was analyzed for BN+15 and the deeper sample collected from 1.5-2.0 feet was analyzed for BN+15 and VOC+15 including xylenes. A total carcinogenic BN concentration of 5.4 ppm was present in the surface sample. Total noncarcinogenic BNs were also present in this sample at a concentration of 4.7 ppm. The deeper sample exceeded the site-specific action levels for carcinogenic and noncarcinogenic BNs with concentrations of 54.3 and 456.9 ppm, respectively. A total VOC concentration of 40.8 ppm was also detected in the deeper sample. This concentration exceeds the site-specific action level of 10 ppm. AEC 3 was previously targeted for cleanup based upon VOC results obtained during the Phase I sampling. Cleanup of this area is proposed in Section IV.

2. AEC 14: Former Drum Storage Area

Two samples were collected for BN+15 analysis from boring 1405. Although ENVIRON requested VOC+15 including xylene analysis of the deeper sample, this testing was inadvertently not performed by the analytical laboratory. Concentrations of total carcinogenic and noncarcinogenic BNs in both samples were well below the site-specific action levels. Based upon the results of VOC analysis performed during the Phase I sampling, cleanup of this area is proposed in Section IV.

3. AEC 16: Former Drum Storage Area

Two samples were collected from boring 1605. The surface sample was analyzed for BN+15, while the deeper sample was analyzed both for BN+15 and VOC+15 including xylenes. Neither sample contained total carcinogenic and noncarcinogenic BN concentrations exceeding the site-specific action levels. The deeper sample, however, contained a total VOC concentration of 1,859 ppm. High levels of VOCs were previously detected in this AEC during the Phase I sampling. Cleanup of this area is proposed in Section IV.

4. AEC 17 (Northern Section): Former Drum Storage Area

One boring, M2401, was completed in the northern portion of AEC 17 as part of the additional sampling phase. Two samples were collected from depths of 0.0-0.5 and 1.5-2.0 feet below the soil surface. The surface sample was analyzed for BN+15. The deeper sample was analyzed for both BN+15 and VOC+15 including xylenes. Total BN concentrations in the surface sample were below the site-specific action levels for total carcinogenic and noncarcinogenic compounds. The concentration of total carcinogenic BNs in the deeper sample was 22.3 ppm, which is not materially in excess of the site-specific action level. The concentrations of total VOCs and noncarcinogenic BNs in this sample were below the site-specific action level. Based upon previous VOC sampling in this AEC, cleanup of this area is proposed in Section IV.

5. AEC 21: Former Aboveground Tank Farm

Two samples were collected from boring 2105 during the additional sampling phase. The surface sample was analyzed for BN+15 and the deeper sample for BN+15 and VOC+15 including xylenes. Total carcinogenic and noncarcinogenic BN concentrations were below the site-specific action levels. The total VOC concentration of 8,700 greatly exceeded the site-specific action level of 10 ppm. Based upon the VOC data obtained from this and previous investigations, cleanup of this area is proposed in Section IV.

6. AEC 23: Tank Wagon Loading Area

Two samples were collected from boring 2303. The surface sample was analyzed for BN+15 and the deeper sample for BN+15 and VOC+15 including xylenes. The concentration of total carcinogenic BNs in the surface sample was 10.1 ppm, which is essentially equivalent to the site-specific action level of 10 ppm. The concentrations of total noncarcinogenic BNs in this sample were below the site-specific action level. Total carcinogenic and noncarcinogenic BN concentrations in the deeper sample were below site-specific action levels. VOCs were not detected. Based upon these results, and the fact that total VOCs less than 10 ppm were detected within this AEC during the Phase I sampling, cleanup of this area is not proposed.

7. AEC 25: Tank Wagon Loading Area

As part of the additional sampling, two samples were collected from boring 2503. The surface sample was analyzed for BN+15 and the deeper sample for BN+15 and VOC+15 including xylenes. Concentrations of all tested parameters were below the site-specific action levels. Based upon the detection of elevated levels of VOCs in another sample from this AEC during the Phase I sampling, cleanup of this area is proposed in Section IV.

D. Areas Not Previously Targeted for Cleanup

1. AEC 2: Dumpster/Trash Compactor Area

Two samples were collected during this phase of sampling from boring 202. The surface sample was analyzed for BN+15 and the deeper sample for VOC+15 including xylenes. Total carcinogenic and noncarcinogenic BN concentrations were below the site-specific action levels, and VOCs were not detected. Previous sampling for VOCs at a depth of 6 to 12 inches within this AEC during the Phase I investigation (boring 201) did not reveal the presence of VOCs. Based upon the fact that VOCs were not detected at depth during this phase of sampling and BNs were not present above site-specific levels, no further action is proposed for this AEC.

2. AEC 5: Phthalic Anhydride Unloading Area

As part of the additional sampling phase, two samples were collected from boring 502. The surface sample was analyzed for BN+15. The deeper sample was analyzed for VOC+15 including xylenes. Total carcinogenic and noncarcinogenic BN concentrations were below site-specific action levels. However, the total VOC concentration of 3,000 ppm was above the site-specific action level of 10 ppm. As a result, cleanup of this AEC is proposed in Section IV.

3. AEC 6: Fuel Oil Underground Storage Tank

During the Phase I sampling program, one soil sample was collected adjacent to the east side of the underground tank and analyzed for PAHs. A concentration of 3.7 ppm of total PAHs was detected. During this recent phase of sampling, three samples were collected from the area adjacent to previous boring 601. The surface sample was analyzed for BN+15. An intermediate depth sample was analyzed for VOC+15 including xylenes. The deeper sample was analyzed for both BN+15 and VOC+15 including xylenes. The concentration of total carcinogenic BNs in the surface sample was 12.7 ppm, which is not materially different from the site-specific action level. The concentration of total noncarcinogenic BNs in this sample was well below the site-specific action level of 100 ppm. Concentrations of total BNs and VOCs in the intermediate and deeper samples were well below the site-specific action levels. Based on these data, no further action is proposed for this AEC.

945990683

4. **AEC 8: Two Fuel Oil Underground Storage Tanks**

As discussed in Section II, NJDEP agreed that previous sampling within this AEC for PAHs satisfies the Department's requirements for characterization sampling. Therefore, additional testing was not performed during this phase of work. Soil borings were previously completed 0-6 inches below the tank inverts at either end of the tanks and west of the center of each tank. Total PAHs were below the site-specific action levels of 10 ppm with the exception of one sample from boring 803 (23 ppm). ENVIRON believes that this level is not materially different from the site-specific action level, and therefore does not warrant cleanup. No further action is proposed.

5. **AEC 9: Discharge of Raw Materials and Resin through Floor**

During the Phase I sampling program, one soil boring (901) was completed through a hole in the floor through which resinous materials had impacted the underlying soils. Elevated levels of VOCs were detected in the sample collected from this boring. In order to determine the extent of this impact, six samples were collected from four borings (902, 903, 904 and 905) as part of the additional sampling phase. Two surface samples were analyzed for BN+15 and four deeper samples were analyzed for VOC+15 including xylenes. One of the samples analyzed for BNs contained a total carcinogenic BN concentration of 13.2 ppm, which is not materially different from the site-specific action level of 10 ppm. All other total BN concentrations were below the site-specific action levels. Total VOCs were either not detected or were present at trace levels in all four samples analyzed for VOC+15. Based upon the previous level of VOCs detected in boring 901 and the presence of resinous materials, cleanup of a small area around boring 901 is proposed in Section IV.

6. **AEC 10: Finished Product and Raw Material Storage**

One soil sample was collected from 0.0-0.5 foot and analyzed for BN+15. The concentration of total carcinogenic BNs was 11.3 ppm, which is not materially different from the site-specific action level. The concentration of noncarcinogenic BNs was well below the site-specific action level. Because the referenced level of carcinogenic BNs is not materially different from the site-specific action level, no further action is proposed for this AEC.

7. **AEC 13: Former Aboveground Storage Tank Area**

Two surface soil samples were collected at boring locations 1305 and 1306 as part of the additional sampling phase. Both samples were analyzed for BN+15.

Concentrations of total carcinogenic and noncarcinogenic BNs were well below the site-specific action levels. As a result, no further action is proposed for this AEC.

8. AEC 15 (Southern Section): Former Drum Storage Area

Two samples were collected from each of two borings, 1506 and 1507, and were analyzed for BN+15. All four samples contained total noncarcinogenic BN concentrations below the site-specific action level. In addition, three of the four samples contained total carcinogenic BN concentrations below the site-specific action level. The other sample had a total carcinogenic BN concentration of 122 ppm, which is significantly above the site-specific action level. As a result, cleanup of this AEC is proposed in Section IV.

9. AEC 17 (Southern Section): Former Drum Storage Area

Two samples were collected from each of four borings as part of this phase of sampling. All samples were analyzed for BN+15. Concentrations of total noncarcinogenic BNs were below the site-specific action level. Seven of the eight samples contained concentrations of total carcinogenic BNs below the site-specific action level. The remaining sample, a duplicate sample, contained carcinogenic BN concentrations of 6 and 34 ppm. Although one of the duplicate samples contained carcinogenic BNs above 10 ppm, the results are considered anomalous and not materially in excess of 10 ppm. Therefore, no further action is proposed for this AEC.

10. AEC 18: Fuel Oil Unloading Area

Two samples were collected from boring 1802. Samples were analyzed for BN+15. The surface sample contained a concentration of total carcinogenic BNs of 16.2 ppm, which is not materially different from the site-specific action level. All other BN concentrations were below the site-specific action levels. As a result, no further action is proposed for this AEC.

11. AEC 26: Drains From Large Tank Farm

Two soil samples were collected from each of the four borings completed through the floor of the tank farm in areas adjacent to former drains for storm water runoff. The four surface samples were analyzed for BN+15, and the four deeper samples were analyzed for VOC+15 including xylenes. Concentrations of total carcinogenic and noncarcinogenic BNs were either non-detect or were well below the site-specific action levels. Concentration of total VOCs in three of the four samples analyzed were well below the site-specific action level. The fourth sample reported a total VOC concentration of 23.9 ppm. Because this level is not materially different from the site-specific action level of 10 ppm, and because other samples from AEC 26 suggest that any contamination present is isolated, no further action is proposed in this AEC.

12. AEC 28: Railroad Siding Runoff Discharge Pipe

One duplicate soil sample was collected from boring 2802 and analyzed for BN+15. The concentration of total noncarcinogenic BNs was below the site-specific action level. The concentrations of total carcinogenic BNs were 10.4 and 17.1 ppm, which are not materially different from the site-specific action level of 10 ppm. Therefore, no further action is proposed for this AEC.

13. Samples Collected Adjacent to Monitoring Wells

During the Phase I sampling program, soil samples were obtained and analyzed for VOCs and BNs during the installation of monitoring wells 1, 6, 9, 10, 21 and 23. With one exception, total BNs were below 1 ppm. Total BNs at 158 ppm were detected in the soil boring adjacent to MW10. This area was previously targeted for cleanup based upon the presence of elevated concentrations of VOCs.

During this phase of sampling, seven borings (B1 through B6 and M1501) were completed adjacent to other monitoring wells in areas not previously targeted for cleanup. One to three soil samples were collected from each boring. All samples were analyzed for BN+15, with two samples also being analyzed for VOC+15 including xylenes.

Borings B-3 and M1501, B-4, and B-6 are located adjacent to monitoring wells MW15, MW16 and MW18, respectively. Each boring was sampled for BN+15. No total carcinogenic or noncarcinogenic BN concentrations above the site-specific action levels were detected in borings B-3, B-4 or B-6. However, elevated BN concentrations were detected in M1501, which is located approximately 5 to 10 feet from boring B-3. Two samples were collected from this boring. The surface sample was analyzed for BN+15, while the deeper sample was analyzed for both BN+15 and VOC+15 including xylenes. Concentrations of total BNs in the surface sample were well below the site-specific action levels. The deeper sample exceeded both the carcinogenic and noncarcinogenic site-specific action levels for BNs with concentrations of 463.6 and 365.2 ppm, respectively. VOCs were not detected in this sample. Based upon the BN data, cleanup of this area is proposed in Section IV.

Boring B-1 is located adjacent to MW7. Two samples were collected. The surface sample was analyzed for BN+15, and the deeper sample was analyzed for BN+15 and VOC+15 including xylenes. The concentration of total BNs in the surface sample was below the site-specific action levels. The concentration of carcinogenic BNs in the deeper sample was 29.7 ppm, which is not materially different from the site-specific action level. The concentrations of total noncarcinogenic BNs and total VOCs in the deeper sample were below the site-specific action levels. Based upon these data, no further work is proposed in the vicinity of this boring.

B-2 is located adjacent to MW12. Three samples were collected and analyzed for BN+15. The surface sample had a total carcinogenic BN concentration of 14.9 ppm, which is not materially different from the site-specific action level. The concentration of total noncarcinogenic BNs for this sample was well below the site-specific action level. Total BN concentrations in the intermediate and deeper samples were also well below the site-specific action levels. Based on these data, no further action is proposed in the vicinity of this boring.

B-5 is located adjacent to monitoring wells MW17 and MW26. Samples were collected at two depths and analyzed for BN+15. The surface duplicate sample had total carcinogenic BN concentrations of 9.3 and 272.1 ppm. Concentrations of total noncarcinogenic BNs in the surface sample were 9.8 and 187.0 ppm. In the deeper sample, the concentration of total carcinogenic BNs was 11.5 ppm, which is not materially different from the site-specific action level. The concentration of total noncarcinogenic BNs for this sample was well below the site-specific action level. Due to the large concentration discrepancies in the duplicate surface sample, resampling is proposed for this area in Section IV. If the results of the confirmatory sampling are not materially different from the site-specific action levels, cleanup will not be proposed. If this is not the case, cleanup of this area will be reflected in the final remedial workplan.

IV. CLEANUP PLAN

A. Introduction

This section describes the proposed Cleanup Plan for the Spencer Kellogg site. The plan consists of a conceptual design for cleanup of VOC- and BN-contaminated soils, and discusses additional tasks that must be completed prior to implementing cleanup. Textron plans to begin the permitting process and the preparation of a detailed work plan following approval of this Cleanup Plan by NJDEP. The Cleanup Plan consists of the following components:

- The overall cleanup objectives;
- The preferred cleanup approach for contaminated soil;
- A sampling program to complete delineation of target areas;
- A schedule to implement the Cleanup Plan; and
- A cost estimate for the proposed cleanup activities.

The Cleanup Plan proposes on-site, low-temperature volatilization as the preferred remedial action for all target areas at the site. Low-temperature volatilization will effectively treat VOCs and BNs to levels below the site-specific cleanup guidelines. A contingency remedial action plan is not included, because the costs provided include as many passes through the low-temperature unit as needed to obtain the necessary reductions in VOC and BN concentrations, although only one such pass is anticipated to be necessary.

B. Cleanup Objectives

The site-specific action levels, set forth in Section III, for VOCs and BNs have been used to assess soil sampling results. In addition, these action levels were used for the purposes of analyzing remedial options and establishing target areas and soil volumes to develop this Cleanup Plan. These site-specific criteria, as listed below, are also proposed as appropriate cleanup targets for this site:

Parameter	Cleanup Target (ppm)
Total Carcinogenic BNs	10
Total Noncarcinogenic BNs	100
Total VOCs	10

C. **Scope of Cleanup**

In establishing the scope of cleanup activities necessary for this site, ENVIRON targeted areas where VOCs are present at concentrations materially in excess of 10 ppm. Those areas where BNs are present at concentrations materially in excess of the proposed cleanup criteria are also targeted for cleanup. As a result of applying the above criteria to site sampling results, no further action is proposed for 13 AECs (AECs 2, 6, 8, 10, 11, 13, 18, 20, 22, 23, 26, 27, and 28). Fourteen AECs and one additional area not within a designated AEC are targeted for remediation based on VOCs and/or BNs present at levels exceeding the cleanup criteria.

Plate 11 presents the areas targeted for cleanup under this approach. Most of these areas were selected based on the presence of VOCs. Some of these areas also contain BNs above the proposed cleanup targets. Two areas, AEC 15 and the area around MW15, are targeted based upon the presence of BNs only. Table 7 summarizes the areas and volume estimates of soil targeted for cleanup. The area and depth of soil in each AEC are based on the results of Phase I, Phase II, and recent additional characterization sampling, field observations during these investigations, depth to ground water, and knowledge of site operating history. In some instances, areas targeted for remediation were extended beyond the original AEC demarcation based on the distance to the nearest "clean" sample location, on judgments as to the possible extent of contamination related to an AEC, or until a physical barrier, such as a building or wall, was reached.

ENVIRON believes this approach has resulted in a conservative estimate, which is likely to have overestimated the volume of soil to be remediated. Prior to cleanup, the delineation sampling described in the next section will be used to verify that ENVIRON's current estimates provide a conservative soil volume estimate for financial assurance purposes. The actual volume of soil that will be remediated, however, will be determined during cleanup through post-excavation sampling and, overall, the volume of soil may well

TABLE 7
Summary of Estimated Soil Volumes Requiring Remediation

Target Area	Area (ft^2)	Depth (ft)	Volume[a] (yd^3)
AEC 1	1,350	3	150
AEC 3	7,999	3.5	1,037
AEC 4	4,990	3.5	647
AEC 5	1,815	2.5	168
AEC 7	1,230	3	137
AEC 9	9	3.5	1
AEC 12	6,050	3	672
AEC 14	3,778	2.5	350
AEC 15	78	2.5	7[b]
AEC 16	6,307	2.5	584
AEC 17	4,701	3	522
AEC 19	3,210	2.5	297
AEC 21	5,150	2	382
AEC 25	5,098	2.5	472
Area around MW15	78	3	9[b]
		TOTAL	5,435

1,982

[a] All remediation volumes are driven by VOCs unless otherwise noted.
[b] Remediation is driven by BNs; the volume is based on remediating soil within a 5-foot radius excavated to the water table; one additional area (around MW17) reported a large discrepancy in duplicate BN data, and will be investigated further to determine if that area should be included as a target area.

288E:PAA00420.W51

1552 – 1332

be less than currently estimated. The depth estimates in each area correspond to the depth to ground water.

D. Pre-Remediation Sampling

1. Introduction

NJDEP has requested delineation sampling in areas targeted for remediation, primarily to ensure that sufficient soil volumes have been estimated for the purpose of financial assurance. As a means of confirming that the estimated remediation bounds reflect conservative estimates, ENVIRON proposes to collect a limited number of delineation soil samples at the locations shown on Plate 12.

Additional limited characterization sampling in the vicinity of Phase I soil samples with concentrations exceeding 1,000 ppm of lead and 20 ppm of arsenic will be conducted prior to cleanup. These sampling locations also are shown on Plate 12. The purpose of this sampling is to ensure that concentrations of those metals materially different from results previously obtained do not exist in these areas.

The approach to and rationale for this sampling are discussed in the following sections. Details regarding the sampling locations, depths and analytical parameters are provided on Table 8.

2. Delineation in Areas Targeted for Remediation

In certain areas of the site, the bounds of remediation are limited by the physical presence of buildings, bermed walls and property lines. In these instances, there is no need for delineation sampling. Where such physical boundaries are not present, however, and where no data exist, delineation samples for VOCs will be collected and analyzed following EPA Method 8020 using a field GC. Additionally, samples will be collected from areas where the presence of BNs has been used to target the area for cleanup to determine if concentrations in the surrounding area are materially different from those levels previously detected or to show that BNs have only a very limited presence. The BN analyses will be performed by a state-certified laboratory using Method 3550 from SW846 for sample preparation and USEPA Method 625 for analysis.

Table 8
Proposed Sampling Locations, Depths, and Analytical Parameters

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
1	0102	288E-0101-SB01	HSAB	1.5-2.0	VOC
7	0702	288E-0702-SB01	HSAB	1.5-2.0	VOC
	0703	288E-0703-SB01	HSAB	1.5-2.0	VOC
	0704	288E-0704-SB01	HSAB	1.5-2.0	VOC
14	1406	288E-1406-SB01	HSAB	1.5-2.0	VOC
	1407	288E-1407-SB01	HSAB	1.5-2.0	VOC
	1408	288E-1408-SB01	HSAB	1.5-2.0	VOC
15	1508	288E-1508-SB01	HSAB	0.0-0.5	BN+15
17	1710	288E-1710-SB01	HSAB	1.5-2.0	VOC
21	2106	288E-2106-SB01	HSAB	1.5-2.0	VOC
	2107	288E-2107-SB01	HSAB	1.5-2.0	VOC
	2108	288E-2108-SB01	HSAB	1.5-2.0	VOC
	2109	288E-2109-SB01	HSAB	1.5-2.0	VOC
	2110	288E-2110-SB01	HSAB	0.0-0.5	lead, arsenic
23	2304	288E-2304-SB01	HSAB	0.0-0.5	lead
25	2504	288E-2503-SB01	HSAB	1.5-2.0	VOC
	B-7	288E-B-7-SB01	HAB	0.0-0.5	BN+15
	B-8	288E-B-8-SB01	HSAB	0.0-0.5	lead
	B-9	288E-B-9-SB01	HSAB	0.0-0.5	lead
	B-10	288E-B-10-SB01	HAB	0.0-0.5	lead

[1]Collection Method Abbreviations:
HAB = Hand Auger Boring
HSAB = Hollow-stem Auger Boring

[2]Depths are measured from the soil surface.

[3]Analytical Parameter Abbreviations:
BN+15 = Priority Pollutant Base/Neutral Compounds plus 15-compound library search (EPA Method 625)
VOC = Priority Pollutant Volatile Organics (EPA Method 8020)
Lead (EPA Method 7420)
Arsenic (EPA Method 7060)

a) VOC Field Analysis

ENVIRON will collect soil samples and perform field GC analysis for VOCs at boring locations adjacent to AECs 1, 7, 14, 17, 21, and 25. All samples will be collected from 18-24 inches below the ground surface.

If the results of the field analysis indicate the presence of VOCs exceeding 10 ppm, ENVIRON will collect and analyze (using field methods) an additional sample 5-10 feet from the initial boring location. This process will continue until the results of the field analysis are such that the remedial boundary can be confidently designated.

b) BN Delineation

ENVIRON will collect one surface sample from boring 1508 for BN+15 analysis. This boring is to be located approximately 5 feet from previous boring 1506. If the results indicate levels materially different from the site-specific action levels, additional sampling and/or cleanup in this area may be necessary.

3. Metals Delineation

ENVIRON will collect samples to be analyzed for lead and, in one instance, arsenic in the vicinity of previous soil samples containing concentrations exceeding 1,000 ppm of lead or 20 ppm of arsenic. These samples are listed on Table 8 and the locations are shown on Plate 12. The purpose of this additional sampling will be to ensure that the levels of lead and arsenic measured at these additional sampling locations are not materially different from those previously obtained. In the event that results of this sampling indicate significantly higher lead or arsenic levels, further investigation will be undertaken.

E. Proposed Cleanup Remedy

This section describes the major components of the proposed cleanup remedy for the Spencer Kellogg facility. The preferred remedial approach for this site is the use of low-temperature volatilization to reduce concentrations of VOCs and BNs from soils in the target areas to below the cleanup criteria. Based on discussions with firms providing this capability, such as Canonie Environmental and Weston Services, Inc., this technology is capable of reducing the concentrations of VOCs and BNs found at the site to below cleanup targets. Textron and ENVIRON have discussed with these firms the feasibility of using this technology at the site, the availability of field units, space and materials handling requirements, soil processing rates (throughput), and cost. In general, based on the experience of these firms, concentrations of VOCs and BNs up to 10,000 and 300 ppm, respectively, can be reduced to below the cleanup targets with a single pass through the system. Feed soil with concentrations higher than these levels may require more than one pass to achieve the cleanup targets. To implement this technology at the site, it will be necessary to obtain a permit to construct/install air quality control equipment and a certificate to operate air quality control equipment for this project.

These units require up to approximately 5,000 ft^2 for setup of the equipment, plus areas for staging soil before and after treatment. Expected throughput rates range from 7.5-20 tons/hr. (5.4-14.3 yds^3/hr) depending on the equipment used, soil moisture content, and contaminant type and concentration. Adjustment of the retention time in the unit can be made as soil from different areas is processed, or additional passes through the unit can be made if particular batches require further treatment. Typically, these units are operated 8 hours per day. Actual field-scale units are available from the above firms for use at the Spencer Kellogg site. Canonie has completed an ECRA cleanup in South Kearny using this process. An 80% in-service factor has been indicated by Canonie (the unit can be expected to be out of service 20% of the time for maintenance).

Contaminated soil from the target areas will be excavated, treated on-site, and placed back in the on-site excavations. Implementation of this remedy will require removal of portions of railroad track in a few target areas and removal of asphalt in most target areas. At the completion of cleanup, these areas will be restored, as necessary.

Textron plans to proceed with obtaining formal bids from qualified contractors and selecting a contractor after submitting this Cleanup Plan to NJDEP. Work will begin on preparing permit applications and the final work plan once NJDEP approval is received. Prior to starting full remediation operations at the site, Textron will submit the detailed work plan to NJDEP containing a quality assurance plan and a health and safety plan. The quality assurance plan will describe the procedures to be followed to insure the quality of data generated in the field. The contractor will be required to implement a health and safety program which complies with all applicable requirements. All on-site personnel will have completed the mandatory 40-hour health and safety training stipulated by the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910. A designated health and safety coordinator will be present on-site to perform air monitoring, establish safety programs, conduct health and safety meetings, and monitor safety procedures as the work progresses.

The following sections briefly describe the major components of the cleanup.

1. **Excavation and Soil Handling**

Soil from most of the target areas will be excavated using conventional equipment (e.g., backhoes) and transported to a designated staging area prior to processing. ENVIRON anticipates that soil from beneath Building 4 (AEC 12) will be removed using specialized equipment (e.g., a vacuum excavator). Soil beneath Building 16 (AEC 9) will be removed manually (i.e., by laborers with shovels) after an opening is cut in the concrete floor.

ENVIRON has met with a structural engineer (Joel Moskowitz of Mueser Rutledge Consulting Engineers) and an excavation contractor (Robert Brown of Code Environmental Services, Inc.) to discuss the feasibility of removing soil from beneath Building 4. According to Mr. Moskowitz, no information was readily available at the plant on the type or capacity of the piles supporting Building 4, although the building appeared to be structurally sound. Assuming that the building is supported on sound piles, it will be possible to remove soil from beneath Building 4. Mr. Moskowitz recommended additional review and analysis to develop an excavation procedure for cleanup. This will include: (1) review of building plans and other data that may be available; (2) examination of the existing structures in greater detail; and (3) examination of the existing backfill, pile caps and piles by excavating several test pits. This work will be required to ensure that remediation under Building 4 can proceed, and to develop an excavation procedure. These activities will be performed during development of the detailed work plan for site cleanup.

The amount of soil excavated each day will be limited to the amount expected to be processed in a day, to minimize the quantity of soil staged at one time. Based on discussions with firms providing low-temperature volatilization capabilities, a pre-screening step will be required to remove debris greater than approximately 2 inches prior to processing in the thermal unit. The oversize material will be checked in the field with an organic vapor analyzer (OVA) or HNu. If no significant reading is observed, the contractor will backfill the oversize material with the treated soil; if a significant reading is observed, the material will be properly classified and disposed of off-site.

Most of the target areas are covered with asphalt that will need to be removed prior to excavation of the underlying soil. AECs 3, 4, 5, 9, 12, and 19 are currently not paved. In addition, a total of approximately 900 feet of railroad track will be removed in AECs 3, 4, and 5.

945990695

2. Low-Temperature Volatilization

The overall process for a low-temperature volatilization system includes a feed hopper, conveyance system, the thermal unit, a quench system, and off-gas control. The thermal unit consists of a drier, which operates at 550-600°F to volatilize organics with a boiling point below this temperature, and an afterburner, which operates at approximately 1200°F to combust organics in the vapor phase. Because of the presence of petroleum hydrocarbons at the Spencer Kellogg site, an afterburner for the vapor phase will be necessary. At this time, it is anticipated that the system and staging areas will be located adjacent to AEC 21, a relatively inactive area of the facility.

Contaminated soil excavated from the target areas will be screened and material less than 2 inches will be staged for processing. Soil will be excavated and brought to the processing area at a rate that closely matches the throughput of the thermal unit, so that a minimum amount of contaminated soil will be staged at any time. The treated soil will be cooled, sampled, and placed back in on-site excavations after determining that the cleanup criteria have been achieved.

3. Off-Site Disposal

Portions of the contaminated soil to be excavated from two AECs will be transported off-site for disposal. In AECs 4 and 12, the surface soil is heavily contaminated with spilled resinous materials. The surface materials from these two AECs are not suitable for treatment in the proposed low-temperature process. Therefore, for planning purposes, it is estimated that approximately the top 6 inches of soil will be scraped away and transported off-site for disposal at an appropriate commercial facility. The remaining soil in AECs 4 and 12 will then be remediated via low-temperature volatilization. The volume of soil from AEC 4 to be disposed off-site is estimated to be 92 yd^3 and the volume of soil from AEC 12 is estimated to be 112 yd^3.

It may also be necessary to dispose of other materials off-site. All oversize material and debris recovered during excavation may not be suitable for backfilling on-site; some of this material may require off-site disposal. There may also be some volume of treated soil that cannot be backfilled due to limitations on the ability to recompact all soil into the original excavations. In addition, asphalt removed from AECs currently paved will be taken off-site; however, this material may be recycled at an asphalt plant rather than disposed of in a landfill. The cost estimate includes allowances for these items.

4. **Site Restoration**

Because excavation of the target areas will disrupt active areas of the facility, these areas will be restored as cleanup is completed in each area. Site restoration activities will include appropriate replacement of railroad tracks and repaving.

F. Remediation Monitoring and Post-Excavation Sampling

During implementation of cleanup, soil sampling will be conducted to monitor the effectiveness of treatment (post-remedial sampling) and to verify that removal of contaminated soil from each target area is complete (post-excavation sampling).

It is expected that the contractor selected to conduct the cleanup will provide on-site analytical capabilities in a mobile laboratory to analyze soil samples for VOCs by GC. The on-site laboratory will perform a certification in accordance with EPA and/or NJDEP protocols to assure compliance with analytical standards, and will analyze samples for VOCs by EPA Method 8020. This method of analysis will serve as the primary verification for post-remedial and post-excavation sampling. Textron proposes to send 10% of all samples to a state-certified analytical laboratory for verification of the on-site analyses.

For post-remedial sampling, Textron proposes to collect and analyze one sample for every 20 cubic yards processed (approximately one sample per hour). Analytical results for these samples will be available the following day so that the previous day's soil volume can be verified as acceptable for backfilling. In the event that the on-site analysis indicates that the cleanup criterion for VOCs is not met, the soil represented by that sample (approximately 20 cubic yards) will be reprocessed through the treatment unit and resampled prior to backfilling. Treated soil will be staged until the off-site analytical results are received (within 48 hours). In the event that off-site analytical results do not agree with the on-site analysis and indicate that the cleanup criteria are not met, the discrepancy will be resolved by first examining the QA/QC procedures, followed by resampling of the treated soil and reprocessing, if necessary. When treating areas with elevated BN concentrations (e.g., AEC 3), a sample will be taken and sent off-site for BN as well as VOC analyses.

With the exception of two isolated areas currently targeted for remediation due to the presence of BNs only (new borings 1506 and 1508), post-excavation samples will be collected every 30 feet along the sidewalls of each excavation in the target areas and analyzed for VOCs by the on-site GC. Textron also proposes to send 10% of the samples to an analytical laboratory for verification testing. Samples will not be collected from the floor of the excavations because each area will be excavated to the water table. As with the post-remediation sampling, in the event that there is a discrepancy between the off-site analytical laboratory and the on-site GC analysis, the difference will be resolved by reviewing the QA/QC data, or further excavation will be performed and additional post-excavation sampling conducted. It is currently believed that the two referenced exceptions to the post-excavation sampling represent localized BN contamination. If the results of the delineation borings proposed in Section IV.D verify this, "hot spot" excavations will be performed without subsequent post-excavation sampling.

In addition, air monitoring as required to satisfy air permit conditions will be conducted and will be described in the detailed work plan.

G. Schedule

This section outlines the anticipated sequence of activities leading to completion of the cleanup pursuant to the proposed Cleanup Plan. Figure 1 is an estimated schedule of activities for the next phase of work and includes an estimate of the timing for implementation of sitewide cleanup. As indicated on the schedule, 2-1/2 months (until the end of 1990) have been factored into the schedule for NJDEP review and approval of this Revised Cleanup Plan, before initiation of the proposed additional sampling at the site. Three months have been estimated for mobilizing and making necessary arrangements for sampling through collection of samples and receipt and evaluation of laboratory results. evaluating the sampling results. Concurrent with the sampling work, a detailed remedial work plan will be prepared and the necessary permits will be obtained. Completion of these activities is estimated to take approximately five months. Mobilization and implementation of cleanup are estimated to take approximately four months. Because the cleanup is scheduled around a July shutdown of the Reichhold plant, substantial delay in receiving NJDEP's approval of the Cleanup Plan could delay remediation. ENVIRON will also submit monthly progress reports to NJDEP after approval of the Cleanup Plan until submission of the final report.

H. Progress and Final Reports

As indicated above, monthly progress reports will be submitted to NJDEP after approval of this Cleanup Plan is received. Progress reports will be prepared using the suggested format in NJDEP's Cleanup Plan Guide and will describe work performed and any problems or delays encountered during implementation. Costs incurred and data collected will be presented in each progress report, as appropriate.

Following the conclusion of the cleanup work, a final report will be prepared and submitted to the NJDEP, as required by the ECRA regulations. Consistent with NJDEP's Cleanup Plan Guide, the major components of the final report will include a narrative summary of cleanup work for each target area, a summary of milestone dates for cleanup activities; copies of manifest or shipping forms for any material transported off-site, including the name of all subcontractors, transporters, and disposal facilities utilized; presentation of all post-excavation and post-treatment sampling results; copies of all permits obtained; and the total actual cost to complete the cleanup. As indicated in Figure 1, two months have been scheduled to complete and submit this report, to allow for receipt and compilation of all manifests, disposal documentation, subcontractor invoices, and other necessary information.

I. Cost Estimate

Table 9 presents the estimated cost to implement the proposed Cleanup Plan. The total cost represents the expenditures to construct the remedial systems and to conduct treatment. Both direct and indirect costs have been considered in the development of the total cost. Direct costs include such items as mobilization/demobilization, all site work, expenditures for equipment, materials, labor, transportation and disposal, and contingencies. Indirect costs, such as engineering and design, and field services and supervision, are added to the total direct costs using standard factors.

It has been necessary to make certain judgments to provide a basis for the cost estimate. The following general judgments and considerations are incorporated into the cost estimate:

- An estimate of $8,500 has been included for pre-remediation sampling for metals, BNs, and VOCs.

- Mobilization/demobilization has been estimated at $265,000 based on discussions with qualified contractors. This includes the contractor's cost associated with development of the detailed work plan and permitting.

- The cost for low-temperature volatilization is based on a unit cost of $90/ton for treatment. This unit cost includes costs to perform all site work (including excavation, treatment, and backfilling treated soil), conduct air monitoring, perform post-excavation and post-treatment soil sampling with on-site analysis, and prepare a final report.

TABLE 9

Cost Estimate for Proposed Cleanup Plan

Cost Item		Costs
Pre-remediation Sampling		$ 8,500
Mobilization/demobilization		265,000
Low-Temperature Volatilization Treatment		659,100
Excavation Under Buildings 4 and 16		100,000
Off-Site Laboratory Verification Analysis		33,000
Transportation and Disposal		240,700
Remove and Replace Railroad		70,200
Repave		43,500
	SUBTOTAL =	$1,420,000
Health and Safety Contingency (10%)		$ 142,000
Scope Contingency (20%)		284,000
	TOTAL DIRECT COST =	$1,846,000
Engineering and Design (10%)		$ 184,600
Field Services and Supervision (7%)		129,200
	TOTAL COST =	$2,159,800

288E:PAA00421.W51

- Removal of soil from under Buildings 4 (AEC 12) and 16 (AEC 9) has been estimated separately from excavation of other AECs, which is included in the on-site treatment unit cost. The cost to remove soil from under Buildings 4 and 16 is estimated at approximately $100,000 based on discussions with contractors. This cost includes a geotechnical inspection and evaluation of the piles to ensure that soil can be removed without compromising the integrity of the structure.

- Transportation and disposal (T&D) cost provides for off-site disposal of the following components of excavated material: (1) soil from the top 6 inches of AECs 4 and 12; (2) debris not suitable for backfill; (3) excess treated soil that cannot be backfilled; and (4) asphalt. The volume of soil from AECs 4 and 12 is estimated to be 204 yd^3. The in-place soil density is assumed to be 1.4 tons/yd^3. It was assumed that 10% of the total material excavated consists of debris greater than 2 inches and that half of this material is not suitable for backfilling on-site. It was also assumed that 5% of the treated soil would not be backfilled because of soil expansion during excavation and limitations on the ability to recompact all treated soil into on-site excavations. An estimated 686 tons of asphalt will be removed from AECs 1, 7, 14, 15, 16, 17, 21, and 25 and the area around MW15. The unit T&D cost for these materials (except asphalt) could range from $150/ton to $230/ton, depending on whether the materials are ultimately disposed in a nonhazardous or hazardous commercial landfill. For purposes of the cost estimate, a unit T&D cost of $230/ton for disposal at a regulated hazardous waste disposal facility is used for these materials. Based on quotes received from contractors, asphalt may be recycled at an asphalt plant at a unit cost of $12/ton.

- Removal and replacement of sections of railroad are estimated at $70,200 based on quotes received from several contractors.

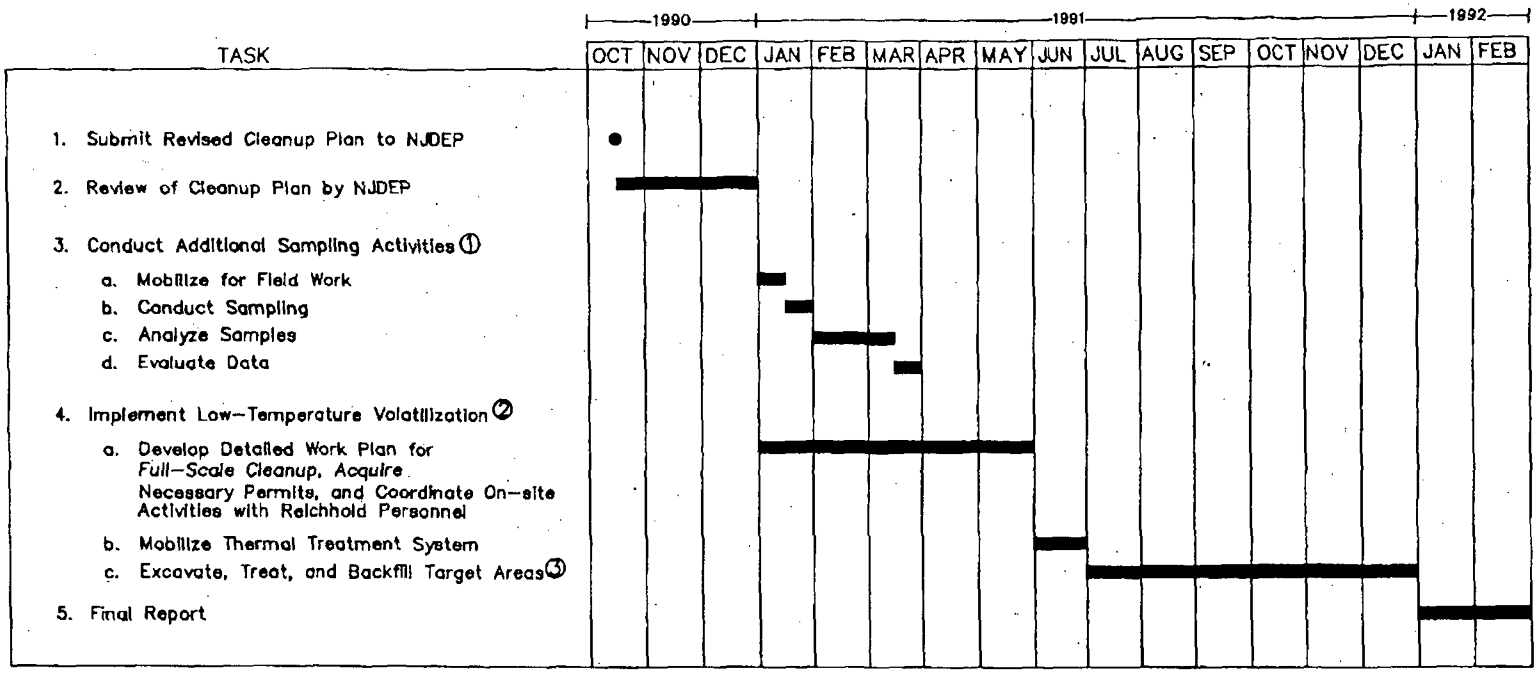
- Repaving those AECs currently paved was calculated using a unit cost of $2/$ft^2$.

Because the Cleanup Plan is conceptual and based on currently available data, contingencies are included to account for unknown conditions. Specifically, a 10% health and safety contingency, to address costs associated with working in protective clothing, and a 20% scope contingency, to account for possible changes that may occur during final design and implementation, have been included. Commonly used factors have been included in the cost estimate to account for engineering and design, and for field services and supervision. The 10% factor for engineering and design is included to cover potential costs beyond those of the contractors associated with developing the work plan, permitting, and coordinating with the current site owner prior to implementing the cleanup. The 7% factor for field services and supervision accounts for anticipated costs for services during cleanup, such as supervising subcontractors, sampling, and preparing progress reports.

This cost estimate is based on information and budgetary estimates provided by potential contractors. Final costs will be dependent upon actual labor and material costs at the time of implementation, actual site conditions encountered during construction and excavation, competitive market conditions, final project schedule, regulatory requirements, actual quantities of soils to be treated, and cleanup levels ultimately accepted by NJDEP. As a result, the final cleanup costs may vary from the estimate presented here and the revised estimate, if appropriate, will be provided in the detailed work plan.

288E:PAA00420.W51

AKH000903



① Assumes NJDEP approval of proposed pre-remediation sampling.

② Based on discussions with potential contractors.

③ Post-excavation sampling will take place simultaneously with excavation, treatment, and backfilling activities. The length of on-site activities depends on the throughput of the treatment unit chosen. Assumes that Reichhold will agree to this schedule.

ENVIRON	CLEANUP IMPLEMENTATION SCHEDULE Former Spencer Kellogg Site	Figure 1

APPENDIX A

**Analytical Results of
Quarterly Ground Water Monitoring**

TABLE A-1
Analytical Results of Quarterly Ground Water Monitoring[1]

Location	Compound	May 89	Aug 89	Nov 89	Feb 90	May 90	July 90
MW6[3]	Benzene	NS	NS	3	NS	NS	NS
	Toluene	NS	NS	ND	NS	NS	NS
	Ethylbenzene	NS	NS	ND	NS	NS	NS
	Total Xylenes	NS	NS	ND	NS	NS	NS
	Trichloroethene	NS	NS	ND	NS	NS	NS
MW10	Benzene	ND	ND	ND	7	ND	ND
	Toluene	15,000	4,300	5,500	37,000	33,000	6,000
	Ethylbenzene	ND	ND	ND	ND	ND	68
	Total Xylenes	ND	ND	ND	ND	ND	250
	Trichloroethene	ND	ND	ND	ND	ND	ND
MW10 (Duplicate Sample)							
	Benzene					ND	
	Toluene					34,000	
	Ethylbenzene					ND	
	Total Xylenes					ND	
	Trichloroethene					ND	
MW13	Benzene	ND	ND	ND	ND	ND	ND
	Toluene	33	ND	ND	ND	21	ND
	Ethylbenzene	40	ND	ND	ND	110	4
	Total Xylenes	ND	ND	ND	ND	410	85
	Trichloroethene	ND	ND	ND	ND	ND	ND
MW14[4]	Benzene	ND	ND	ND	ND	ND	NS
	Toluene	ND	ND	4	ND	ND	NS
	Ethylbenzene	ND	ND	ND	ND	ND	NS
	Total Xylenes	ND	ND	ND	ND	18	NS
	Trichloroethene	ND	ND	ND	ND	ND	NS

TABLE A-1
Analytical Results of Quarterly Ground Water Monitoring[1]

Location	Compound	May 89	Aug 89	Nov 89	Feb 90	May 90	July 90
MW15	Benzene	ND	ND	ND	ND	ND	ND
	Toluene	ND	ND	ND	ND	ND	ND
	Ethylbenzene	ND	ND	ND	ND	ND	ND
	Total Xylenes	ND	ND	ND	ND	ND	ND
	Trichloroethene	ND	ND	7	ND	ND	ND
MW20	Benzene	ND	ND	ND	ND	ND	ND
	Toluene	34	4	ND	92	38	26
	Ethylbenzene	34	14	13	38	29	36
	Total Xylenes	ND	ND	ND	ND	ND	ND
	Trichloroethene	ND	ND	ND	ND	ND	ND
MW20 (Duplicate Sample)							
	Benzene						7
	Toluene						30
	Ethylbenzene						28
	Total Xylenes						ND
	Trichloroethene						ND

Notes:

1 All concentrations are in parts per billion (ppb).

2 Abbreviations:
ND = not detected.
NS = not sampled.

3 At that time, hydrogeological data suggested that a component of ground water flow may have been moving towards MW6 from areas containing elevated levels of volatile organic compounds (VOCs). As a result, MW6 was sampled during the November 1989 quarterly ground water sampling. MW6 has not been included in subsequent ground water sampling rounds due to the absence of significant levels of VOCs evidenced by the November 1989 ground water results and due to general patterns of ground water flow in this area.

4 MW14 was not sampled in July 1990 due to physical damage to the well casing. The well will be replaced and sampled during subsequent quarterly ground water sampling.

288E:PAA005DB.W51

FL01047

APPENDIX B

Summary of Analytical Results of Additional ECRA Sampling

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 2

ENVIRON SAMPLE ID	288E-0202-SB01	288E-0202-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.43 J	
Benzo(a)Pyrene	0.34	
Benzo(b)Fluoranthene	0.61	
Benzo(k)Fluoranthene	ND	
Chrysene	0.58	
Dibenz(a,h)Anthracene	0.05 J	
Indeno(1,2,3-cd)Pyrene	0.18 J	
Total Carcinogens	2.19	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	
Acenaphthene	ND	
Acenaphthylene	0.05 J	
Anthracene	0.10 J	
Benzo(g,h,i)Perylene	0.18 J	
bis(2-ethylhexyl)phthalate	3.20	
Butylbenzylphthalate	1.10	
Di-n-Butylphthalate	ND	
Di-n-Octyl Phthalate	0.31	
Diethylphthalate	ND	
Fluoranthene	0.64	
Fluorene	0.08 J	
Hexachlorobenzene	1.40	
Naphthalene	1.90	
Phenanthrene	0.58 J	
Pyrene	0.51	
Total Noncarcinogens	10.05	
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		ND
Total Xylenes		ND
Total Volatile Compounds		ND

AKH000908

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 3

ENVIRON SAMPLE ID	288E-0306-SB01	288E-0306-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.68	16.00
Benzo(a)Pyrene	0.70	3.60
Benzo(b)Fluoranthene	2.10	14.00
Benzo(k)Fluoranthene	ND	ND
Chrysene	1.20	19.00
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	0.73	2.70
Total Carcinogens	5.41	54.30
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	ND	34.00
Acenaphthylene	ND	ND
Anthracene	ND	12.00
Benzo(g,h,i)Perylene	0.69	1.90
bis(2-ethylhexyl)phthalate	0.54 B	ND
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	1.00	110.00
Fluorene	ND	37.00
Hexachlorobenzene	ND	ND
Naphthalene	0.91	76.00
Phenanthrene	0.59	130.00
Pyrene	1.00	56.00
Total Noncarcinogens	4.73	456.90
Volatile Organic Compounds		
Benzene		1.40
Ethylbenzene		11.00
Methylene Chloride		ND
Toluene		1.40
Total Xylenes		27.00
Total Volatile Compounds		40.80

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 5

ENVIRON SAMPLE ID	288E-0502-SB01	288E-0502-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	1.10	
Benzo(a)Pyrene	1.10	
Benzo(b)Fluoranthene	2.10	
Benzo(k)Fluoranthene	ND	
Chrysene	1.40	
Dibenz(a,h)Anthracene	0.17	
Indeno(1,2,3-cd)Pyrene	1.10	
Total Carcinogens	6.97	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	0.12	
Acenaphthene	0.17	
Acenaphthylene	ND	
Anthracene	0.28	
Benzo(g,h,i)Perylene	1.30	
bis(2-ethylhexyl)phthalate	0.62	
Butylbenzylphthalate	ND	
Di-n-Butylphthalate	0.06 J	
Di-n-Octyl Phthalate	ND	
Diethylphthalate	ND	
Fluoranthene	2.10	
Fluorene	0.10	
Hexachlorobenzene	ND	
Naphthalene	0.72	
Phenanthrene	1.40	
Pyrene	1.60	
Total Noncarcinogens	8.46	
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		3000.00
Total Xylenes		ND
Total Volatile Compounds		3000.00

AKH000910

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 6

ENVIRON SAMPLE ID	288E-0603-SB01	288E-0603-SB02	288E-0603-SB03
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	3.0-3.5
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	2.20		0.30 J
Benzo(a)Pyrene	2.20		0.30
Benzo(b)Fluoranthene	4.00		0.46
Benzo(k)Fluoranthene	ND		ND
Chrysene	2.50		0.32
Dibenz(a,h)Anthracene	ND		ND
Indeno(1,2,3-cd)Pyrene	1.80		0.18
Total Carcinogens	12.70		1.56
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND		ND
Acenaphthene	ND		0.04 J
Acenaphthylene	ND		ND
Anthracene	0.29		0.09
Benzo(g,h,i)Perylene	1.80		0.20
bis(2-ethylhexyl)phthalate	0.46		ND
Butylbenzylphthalate	ND		ND
Di-n-Butylphthalate	ND		ND
Di-n-Octyl Phthalate	ND		ND
Diethylphthalate	ND		ND
Fluoranthene	4.10		0.70
Fluorene	ND		0.07 J
Hexachlorobenzene	ND		ND
Naphthalene	0.26		0.15
Phenanthrene	1.30		0.47
Pyrene	4.60		0.67
Total Noncarcinogens	12.81		2.39
Volatile Organic Compounds			
Benzene		ND	ND
Ethylbenzene		ND	ND
Methylene Chloride		0.01	0.01 J
Toluene		ND	ND
Total Xylenes		0.04	0.00 J
Total Volatile Compounds		0.04	0.01

AKH000911

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

unexcavated

AEC 9

ENVIRON SAMPLE ID	288E-0902-SB01	288E-0903-SB01	288E-0903-SB02	288E-0904-SB01	288E-0904-SB02	288E-0905-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	1.0-1.2	0.0-0.5	0.5-0.8	0.0-0.5	1.5-1.7	1.3-1.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene		0.36		2.30		
Benzo(a)Pyrene		0.29		2.40		
Benzo(b)Fluoranthene		0.53		2.20		
Benzo(k)Fluoranthene		ND		1.60		
Chrysene		0.41		2.60		
Dibenz(a,h)Anthracene		ND		0.37		
Indeno(1,2,3-cd)Pyrene		0.16		1.70		
Total Carcinogens		1.75		13.17		
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene		ND		ND		
Acenaphthene		0.05 J		0.07 J		
Acenaphthylene		ND		0.06 J		
Anthracene		0.11		0.18		
Benzo(g,h,i)Perylene		ND		1.70		
bis(2-ethylhexyl)phthalate		ND		0.09		
Butylbenzylphthalate		ND		ND		
Di-n-Butylphthalate		ND		ND		
Di-n-Octyl Phthalate		ND		ND		
Diethylphthalate		ND		ND		
Fluoranthene		0.91		4.10		
Fluorene		0.04 J		0.05 J		
Hexachlorobenzene		ND		ND		
Naphthalene		ND		0.11		
Phenanthrene		0.77		1.50		
Pyrene		0.91		4.70		
Total Noncarcinogens		2.79		12.56		
Volatile Organic Compounds						
Benzene	ND		ND		ND	ND
Ethylbenzene	ND		ND		ND	ND
Methylene Chloride	ND		ND		ND	ND
Toluene	0.01		ND		ND	ND
Total Xylenes	ND		ND		ND	ND
Total Volatile Compounds	0.01		ND		ND	ND

AKH000912

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 10	
ENVIRON SAMPLE ID	288E-1003-SB01
MATRIX	Soil
COLLECTION METHOD	HSAB
DEPTH (feet)	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds	
Benzo(a)Anthracene	2.00
Benzo(a)Pyrene	2.30
Benzo(b)Fluoranthene	2.70
Benzo(k)Fluoranthene	ND
Chrysene	2.50
Dibenz(a,h)Anthracene	0.19
Indeno(1,2,3-cd)Pyrene	1.60
Total Carcinogens	11.29
Noncarcinogenic Base/Neutral Organic Compounds	
1,2,4-Trichlorobenzene	ND
Acenaphthene	0.12
Acenaphthylene	0.10
Anthracene	0.39
Benzo(g,h,i)Perylene	1.80
bis(2-ethylhexyl)phthalate	4.40 B
Butylbenzylphthalate	ND
Di-n-Butylphthalate	ND
Di-n-Octyl Phthalate	ND
Diethylphthalate	ND
Fluoranthene	4.80
Fluorene	0.14
Hexachlorobenzene	ND
Naphthalene	0.10
Phenanthrene	2.20
Pyrene	3.70
Total Noncarcinogens	17.75
Volatile Organic Compounds	
Benzene	
Ethylbenzene	
Methylene Chloride	
Toluene	
Total Xylenes	
Total Volatile Compounds	

AKH000913

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 13

ENVIRON SAMPLE ID	288E-1305-SB01	288E-1306-SB01
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.41	0.29 J
Benzo(a)Pyrene	0.37	0.26
Benzo(b)Fluoranthene	0.77	0.49
Benzo(k)Fluoranthene	ND	ND
Chrysene	0.48	0.42
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	0.34	0.22
Total Carcinogens	2.37	1.68
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.03 J	ND
Acenaphthylene	ND	ND
Anthracene	0.08 J	0.06 J
Benzo(g,h,i)Perylene	ND	0.29
bis(2-ethylhexyl)phthalate	0.68 B	0.50 B
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	0.02	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	0.05 J	ND
Fluoranthene	0.78	0.47
Fluorene	0.04 J	ND
Hexachlorobenzene	ND	ND
Naphthalene	0.11	0.13
Phenanthrene	0.41	0.42
Pyrene	0.85	0.39
Total Noncarcinogens	3.04	2.26
Volatile Organic Compounds		
Benzene		
Ethylbenzene		
Methylene Chloride		
Toluene		
Total Xylenes		
Total Volatile Compounds		

AKH000914

945990714

FI 01054

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 14

ENVIRON SAMPLE ID	288E-1405-SB01	288E-1405-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	ND	ND
Benzo(a)Pyrene	ND	ND
Benzo(b)Fluoranthene	ND	ND
Benzo(k)Fluoranthene	ND	ND
Chrysene	ND	ND
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND
Total Carcinogens	ND	ND
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	ND	ND
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzo(g,h,i)Perylene	ND	ND
bis(2-ethylhexyl)phthalate	8.50	0.51
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	0.51 J	0.10 J
Fluorene	ND	ND
Hexachlorobenzene	ND	ND
Naphthalene	11.00	0.04 J
Phenanthrene	0.40 J	0.08
Pyrene	0.37 J	ND
Total Noncarcinogens	20.78	0.73
Volatile Organic Compounds		
Benzene		
Ethylbenzene		
Methylene Chloride		
Toluene		
Total Xylenes		
Total Volatile Compounds		

AKH000915

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 15

ENVIRON SAMPLE ID	288E-1506-SB01	288E-1506-SB03	288E-1507-SB01	288E-1507-SB03
MATRIX	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.0-1.5	0.0-0.5	2.0-4.0
Carcinogenic Base/Neutral Organic Compounds				
Benzo(a)Anthracene	25.00	ND	0.98	ND
Benzo(a)Pyrene	25.00	0.04 J	1.40	0.82
Benzo(b)Fluoranthene	23.00	0.04 J	2.50	1.30 J
Benzo(k)Fluoranthene	ND	ND	ND	ND
Chrysene	25.00	ND	1.20	1.30
Dibenz(a,h)Anthracene	4.40	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	20.00	ND	1.40	1.30
Total Carcinogens	122.40	0.08	7.48	4.72
Noncarcinogenic Base/Neutral Organic Compounds				
1,2,4-Trichlorobenzene	ND	ND	ND	ND
Acenaphthene	2.70	ND	ND	ND
Acenaphthylene	1.20	ND	ND	ND
Anthracene	11.00	ND	ND	ND
Benzo(g,h,i)Perylene	20.00	ND	1.50	1.30 J
bis(2-ethylhexyl)phthalate	4.70	0.41	0.15 B	ND
Butylbenzylphthalate	ND	ND	ND	ND
Di-n-Butylphthalate	ND	0.04 J	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND	ND
Diethylphthalate	ND	ND	ND	ND
Fluoranthene	ND	0.06 J	1.10	1.60
Fluorene	5.80	ND	ND	0.69
Hexachlorobenzene	ND	ND	ND	ND
Naphthalene	5.00	0.67	0.19	0.48 J
Phenanthrene	0.21 J	0.05 J	0.42	2.50
Pyrene	0.28	0.05 J	0.82	0.72
Total Noncarcinogens	50.89	1.28	4.18	7.27
Volatile Organic Compounds				
Benzene				
Ethylbenzene				
Methylene Chloride				
Toluene				
Total Xylenes				
Total Volatile Compounds				

AKH000916

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 16

ENVIRON SAMPLE ID	288E-1605-SB01	288E-1605-SB02	288E-1605-SB22
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	ND	ND	ND
Benzo(a)Pyrene	ND	ND	ND
Benzo(b)Fluoranthene	ND	ND	ND
Benzo(k)Fluoranthene	ND	ND	ND
Chrysene	ND	ND	ND
Dibenz(a,h)Anthracene	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND
Total Carcinogens	ND	ND	ND
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND	ND	ND
Acenaphthene	ND	ND	ND
Acenaphthylene	ND	ND	ND
Anthracene	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND
bis(2-ethylhexyl)phthalate	3.40	1.90	2.20
Butylbenzylphthalate	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND
Diethylphthalate	ND	ND	ND
Fluoranthene	ND	ND	ND
Fluorene	ND	ND	ND
Hexachlorobenzene	ND	ND	ND
Naphthalene	14.00	22.00	15.00
Phenanthrene	0.22 J	ND	ND
Pyrene	ND	ND	ND
Total Noncarcinogens	17.62	23.90	17.20
Volatile Organic Compounds			
Benzene		ND	
Ethylbenzene		410.00	
Methylene Chloride		ND	
Toluene		49.00 J	
Total Xylenes		1400.00	
Total Volatile Compounds		1859.00	

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 17

ENVIRON SAMPLE ID	288E-1706-SB01	288E-1706-SB03	288E-1707-SB01	288E-1707-SB03	288E-1707-SB11	288E-1707-SB33
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	0.0-0.5	0.5-1.0	0.0-0.5	0.5-1.0
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	ND	ND	5.10	ND	1.10	0.55 B
Benzo(a)Pyrene	ND	ND	6.40	ND	1.20	0.63
Benzo(b)Fluoranthene	ND	ND	6.40	ND	1.30	0.73 J
Benzo(k)Fluoranthene	ND	0.26	4.40	ND	ND	0.51
Chrysene	ND	0.50	5.60	ND	1.20	0.68
Dibenz(a,h)Anthracene	ND	ND	0.47	ND	0.17	0.12 J
Indeno(1,2,3-cd)Pyrene	ND	ND	5.60	ND	1.10	0.43 J
Total Carcinogens	ND	0.76	33.97	ND	6.07	3.65
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	0.08	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND
Anthracene	ND	0.11	0.43	ND	0.08	0.07 J
Benzo(g,h,i)Perylene	ND	ND	5.80	ND	1.30	0.45 J
bis(2-ethylhexyl)phthalate	0.42 B	0.19	0.15 B	ND	ND	0.10 J,B
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND	0.13 J	ND	0.07 J
Di-n-Octyl Phthalate	ND	ND	ND	ND	ND	ND
Diethylphthalate	ND	0.03 J	ND	ND	ND	ND
Fluoranthene	0.08 J	ND	7.10	ND	1.20	0.74
Fluorene	ND	0.07 J	0.09	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND	ND	ND
Naphthalene	0.03 J	0.58	2.10	0.32	0.54	0.59
Phenanthrene	0.07	0.58	2.40	0.21 J	0.42	0.43 J
Pyrene	ND	1.10	5.00	ND	1.50	0.69
Total Noncarcinogens	0.60	2.66	23.15	0.66	5.04	3.13
Volatile Organic Compounds						
Benzene						
Ethylbenzene						
Methylene Chloride						
Toluene						
Total Xylenes						
Total Volatile Compounds						

AKH000918

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 17

ENVIRON SAMPLE ID	288E-1708-SB01	288E-1708-SB03	288E-1708-SB11	288E-1709-SB01	288E-1709-SB03	288E-M2401-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	2.5-3.0	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	0.12 J	1.10	ND	1.50	1.10	0.83 J
Benzo(a)Pyrene	0.11	1.20	0.07 J	ND	1.20	0.81
Benzo(b)Fluoranthene	0.23	2.60	0.10 J	1.60	1.80	1.70
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Chrysene	0.16	1.90	0.09 J	1.90	1.30	1.00
Dibenz(a,h)Anthracene	ND	ND	ND	0.12	ND	ND
Indeno(1,2,3-cd)Pyrene	0.09	1.10	0.08 J	1.10	0.69	1.00
Total Carcinogens	0.71	7.90	0.34	6.22	6.09	5.34
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	0.05 J	ND	0.12 J
Acenaphthylene	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	0.23	0.10	0.09 J
Benzo(g,h,i)Perylene	0.09	1.30	0.11 J	1.20	0.82	0.83
bis(2-ethylhexyl)phthalate	0.10	ND	0.10	0.10	ND	2.60
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND	ND	ND	ND
Diethylphthalate	ND	ND	ND	ND	ND	ND
Fluoranthene	0.35	1.90	0.14	1.80	1.20	1.70
Fluorene	ND	ND	ND	0.07 J	0.10	0.13 J
Hexachlorobenzene	ND	ND	ND	ND	ND	ND
Naphthalene	0.17	1.20	0.03 J	0.83	0.16	1.60
Phenanthrene	0.18 J	1.30	0.10 J	1.30	0.78	1.20
Pyrene	0.17	1.70	0.13	2.50	1.30	1.20
Total Noncarcinogens	1.06	7.40	0.61	8.08	4.46	9.47
Volatile Organic Compounds						
Benzene						
Ethylbenzene						
Methylene Chloride						
Toluene						
Total Xylenes						
Total Volatile Compounds						

AKH000919

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 17

ENVIRON SAMPLE ID	288E-M2401-SB02	288E-M2401-SB22
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	1.5-2.0	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	2.70	
Benzo(a)Pyrene	3.50	
Benzo(b)Fluoranthene	5.40	
Benzo(k)Fluoranthene	3.50	
Chrysene	3.00	
Dibenz(a,h)Anthracene	0.71	
Indeno(1,2,3-cd)Pyrene	3.50	
Total Carcinogens	22.31	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	
Acenaphthene	ND	
Acenaphthylene	ND	
Anthracene	0.15	
Benzo(g,h,i)Perylene	3.70	
bis(2-ethylhexyl)phthalate	0.07 J	
Butylbenzylphthalate	ND	
Di-n-Butylphthalate	ND	
Di-n-Octyl Phthalate	ND	
Diethylphthalate	ND	
Fluoranthene	2.60	
Fluorene	0.10	
Hexachlorobenzene	ND	
Naphthalene	0.69	
Phenanthrene	1.20	
Pyrene	1.70	
Total Noncarcinogens	10.21	
Volatile Organic Compounds		
Benzene	ND	ND
Ethylbenzene	0.00 J	0.00 J
Methylene Chloride	ND	0.01
Toluene	ND	ND
Total Xylenes	0.04	0.09
Total Volatile Compounds	0.04	0.10

AKH000920

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 18

ENVIRON SAMPLE ID	288E-1802-SB01	288E-1802-SB03
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	3.60	1.60
Benzo(a)Pyrene	3.30	1.70
Benzo(b)Fluoranthene	3.40	1.20
Benzo(k)Fluoranthene	ND	ND
Chrysene	4.20	1.80
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	1.70	1.90
Total Carcinogens	16.20	8.20
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	ND	ND
Acenaphthylene	ND	0.12 J
Anthracene	1.20	0.60
Benzo(g,h,i)Perylene	2.00	2.00
bis(2-ethylhexyl)phthalate	ND	0.12
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	6.30	3.40
Fluorene	ND	0.17 J
Hexachlorobenzene	ND	ND
Naphthalene	0.49	0.47
Phenanthrene	4.60	2.30
Pyrene	8.60	2.90
Total Noncarcinogens	23.19	12.08
Volatile Organic Compounds		
Benzene		
Ethylbenzene		
Methylene Chloride		
Toluene		
Total Xylenes		
Total Volatile Compounds		

AKH000921

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 21

ENVIRON SAMPLE ID	288E-2105-SB01	288E-2105-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	ND	ND
Benzo(a)Pyrene	0.50 J	ND
Benzo(b)Fluoranthene	0.92 J	ND
Benzo(k)Fluoranthene	ND	ND
Chrysene	0.73 J	ND
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND
Total Carcinogens	2.15	ND
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.27 J	ND
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzo(g,h,i)Perylene	ND	ND
bis(2-ethylhexyl)phthalate	1.80	ND
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	1.40	0.53 J
Fluorene	ND	ND
Hexachlorobenzene	ND	ND
Naphthalene	19.00	19.00
Phenanthrene	1.30 J	0.48 J
Pyrene	0.85	0.37 J
Total Noncarcinogens	24.62	20.38
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		1800.00
Methylene Chloride		ND
Toluene		1400.00
Total Xylenes		5500.00
Total Volatile Compounds		8700.00

AKH000922

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 23

ENVIRON SAMPLE ID	288E-2303-SB01	288E-2303-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	1.70	1.30 J
Benzo(a)Pyrene	1.70	1.40
Benzo(b)Fluoranthene	3.30	3.00
Benzo(k)Fluoranthene	ND	ND
Chrysene	1.90	1.60
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	1.50	1.50 J
Total Carcinogens	10.10	8.80
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.48	0.39 J
Acenaphthylene	ND	ND
Anthracene	0.38	0.30 J
Benzo(g,h,i)Perylene	1.50	1.30 J
bis(2-ethylhexyl)phthalate	19.00	2.90
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	3.50	2.50
Fluorene	0.48	0.44 J
Hexachlorobenzene	ND	ND
Naphthalene	12.00	6.10
Phenanthrene	2.30	1.50 J
Pyrene	2.70	1.80
Total Noncarcinogens	42.34	17.23
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		ND
Total Xylenes		ND
Total Volatile Compounds		ND

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

[illegible]

but not tested for in prior samples

AEC 25

ENVIRON SAMPLE ID	288E-2503-SB01	288E-2503-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.52	0.16 J
Benzo(a)Pyrene	0.50	0.10
Benzo(b)Fluoranthene	0.83	0.18
Benzo(k)Fluoranthene	ND	ND
Chrysene	0.65	0.23
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	0.37	ND
Total Carcinogens	2.87	0.67
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.06 J	0.16
Acenaphthylene	ND	ND
Anthracene	0.13	0.05 J
Benzo(g,h,i)Perylene	0.41	ND
bis(2-ethylhexyl)phthalate	1.00	1.50
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	0.91	0.53
Fluorene	0.06 J	0.10
Hexachlorobenzene	ND	ND
Naphthalene	0.19	0.19
Phenanthrene	0.74	0.58
Pyrene	0.84	0.46
Total Noncarcinogens	4.34	3.57
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		0.01
Total Xylenes		ND
Total Volatile Compounds		0.01

AKH000924

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 26

ENVIRON SAMPLE ID	288E-2601-SB01	288E-2601-SB02	288E-2602-SB01	288E-2602-SB02	288E-2603-SB01	288E-2603-SB02
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2	0.2-0.5	1.7-2.0	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	ND		ND		ND	
Benzo(a)Pyrene	ND		ND		ND	
Benzo(b)Fluoranthene	ND		ND		ND	
Benzo(k)Fluoranthene	ND		ND		ND	
Chrysene	ND		ND		ND	
Dibenz(a,h)Anthracene	ND		ND		ND	
Indeno(1,2,3-cd)Pyrene	ND		ND		ND	
Total Carcinogens	ND		ND		ND	
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND		ND		ND	
Acenaphthene	ND		ND		ND	
Acenaphthylene	ND		ND		ND	
Anthracene	ND		ND		ND	
Benzo(g,h,i)Perylene	ND		ND		ND	
bis(2-ethylhexyl)phthalate	0.61		ND		ND	
Butylbenzylphthalate	ND		ND		ND	
Di-n-Butylphthalate	ND		ND		ND	
Di-n-Octyl Phthalate	ND		ND		ND	
Diethylphthalate	ND		ND		ND	
Fluoranthene	ND		ND		ND	
Fluorene	ND		ND		ND	
Hexachlorobenzene	ND		ND		ND	
Naphthalene	0.31		66.0		ND	
Phenanthrene	ND		ND		ND	
Pyrene	ND		ND		ND	
Total Noncarcinogens	0.92		66.0		ND	
Volatile Organic Compounds						
Benzene		ND		ND		ND
Ethylbenzene		ND		3.70		ND
Methylene Chloride		0.01		ND		ND
Toluene		ND		0.19 J		ND
Total Xylenes		ND		20.00		ND
Total Volatile Compounds		0.01		23.89		ND

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 26

ENVIRON SAMPLE ID	288E-2604-SB01	288E-2604-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	ND	
Benzo(a)Pyrene	ND	
Benzo(b)Fluoranthene	ND	
Benzo(k)Fluoranthene	ND	
Chrysene	ND	
Dibenz(a,h)Anthracene	ND	
Indeno(1,2,3-cd)Pyrene	ND	
Total Carcinogens	ND	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	
Acenaphthene	ND	
Acenaphthylene	ND	
Anthracene	ND	
Benzo(g,h,i)Perylene	ND	
bis(2-ethylhexyl)phthalate	ND	
Butylbenzylphthalate	ND	
Di-n-Butylphthalate	ND	
Di-n-Octyl Phthalate	ND	
Diethylphthalate	ND	
Fluoranthene	ND	
Fluorene	ND	
Hexachlorobenzene	ND	
Naphthalene	ND	
Phenanthrene	ND	
Pyrene	ND	
Total Noncarcinogens	ND	
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		0.01
Toluene		ND
Total Xylenes		ND
Total Volatile Compounds		0.01

945990726

F[illegible]01066

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 28

ENVIRON SAMPLE ID	288E-2802-SB01	288E-2802-SB11
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	3.10	1.60
Benzo(a)Pyrene	3.20	1.70
Benzo(b)Fluoranthene	3.30	2.00
Benzo(k)Fluoranthene	ND	1.30
Chrysene	3.90	1.80
Dibenz(a,h)Anthracene	0.49	0.33
Indeno(1,2,3-cd)Pyrene	3.10	1.70
Total Carcinogens	17.09	10.43
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.68	0.10
Acenaphthylene	0.10 J	0.02 J
Anthracene	0.78	0.30
Benzo(g,h,i)Perylene	3.10	1.80
bis(2-ethylhexyl)phthalate	22.00	0.56
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	6.00	3.20
Fluorene	ND	0.11
Hexachlorobenzene	ND	ND
Naphthalene	2.60	0.17
Phenanthrene	4.20	1.50
Pyrene	5.40	2.40
Total Noncarcinogens	44.86	10.16
Volatile Organic Compounds		
Benzene		
Ethylbenzene		
Methylene Chloride		
Toluene		
Total Xylenes		
Total Volatile Compounds		

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

	MW7					
ENVIRON SAMPLE ID	288E-B-1-SB01	288E-B-1-SB02	288E-B-1-SB03	288E-B-2-SB01	288E-B-2-SB02	288E-B-2-SB03
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	1.5-2.0	0.0-0.5	2.0-3.0	3.0-3.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	0.72		3.40	2.90	0.69	ND
Benzo(a)Pyrene	0.73		6.00	2.90	0.67	ND
Benzo(b)Fluoranthene	1.80		7.80	3.00	0.80	ND
Benzo(k)Fluoranthene	ND		ND	ND	ND	ND
Chrysene	1.10		5.00	2.80	0.87	0.05 J
Dibenz(a,h)Anthracene	ND		0.73	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.61		6.80	3.30	0.60	ND
Total Carcinogens	4.96		29.73	14.90	3.63	0.05
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND		ND	ND	ND	ND
Acenaphthene	0.04 J		0.10	ND	ND	ND
Acenaphthylene	0.03 J		0.50	ND	ND	ND
Anthracene	0.12		0.69	0.83	0.22	ND
Benzo(g,h,i)Perylene	0.72		8.90	3.00	0.63	ND
bis(2-ethylhexyl)phthalate	2.60		0.29	2.00	2.10 B	0.08 J
Butylbenzylphthalate	ND		ND	ND	ND	ND
Di-n-Butylphthalate	0.03 J		ND	ND	0.13 J	ND
Di-n-Octyl Phthalate	ND		ND	ND	ND	ND
Diethylphthalate	ND		ND	ND	ND	ND
Fluoranthene	1.50		4.70	7.70	1.60	0.07 J
Fluorene	0.05 J		0.20	0.23	0.10 J	ND
Hexachlorobenzene	ND		ND	ND	ND	ND
Naphthalene	0.16		0.39	0.20	ND	0.03 J
Phenanthrene	0.82		3.90	3.80	1.20	0.09 J
Pyrene	1.60		4.30	5.30	1.20	0.04 J
Total Noncarcinogens	7.67		23.97	23.06	7.18	0.31
Volatile Organic Compounds						
Benzene		ND				
Ethylbenzene		0.00 J				
Methylene Chloride		ND				
Toluene		0.18				
Total Xylenes		0.03				
Total Volatile Compounds		0.21				

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-B-3-SB01	288E-B-3-SB03	288E-B-4-SB01	288E-B-5-SB01	288E-B-5-SB03	288E-B-5-SB11
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HAB	HAB	HAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	1.0-1.5	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	0.45	0.82	1.10	1.50	0.84	39.00
Benzo(a)Pyrene	0.47	1.20	1.10	1.50	2.10	33.00
Benzo(b)Fluoranthene	0.83	1.10	1.90	3.20	4.10	38.00
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	91.00
Chrysene	0.58	1.20	1.30	1.80	1.10	45.00
Dibenz(a,h)Anthracene	ND	0.16	0.16	ND	0.25	3.10
Indeno(1,2,3-cd)Pyrene	0.37	1.10	0.81	1.30	3.10	23.00
Total Carcinogens	2.70	5.58	6.37	9.30	11.49	272.10
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	0.28	0.07 J	ND	0.62
Acenaphthylene	ND	ND	ND	ND	0.15 J	ND
Anthracene	0.08	0.05 J	0.34	0.23	0.08 J	4.80
Benzo(g,h,i)Perylene	0.38	1.30	0.80	1.30	3.10	19.00
bis(2-ethylhexyl)phthalate	0.14	ND	0.30	0.93	0.44	0.88
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate	0.19	ND	ND	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND	ND	0.77	ND
Diethylphthalate	ND	ND	ND	ND	ND	ND
Fluoranthene	1.30	0.88	3.40	3.50	0.78	82.00
Fluorene	ND	ND	0.24	0.08	ND	0.69
Hexachlorobenzene	ND	ND	ND	ND	ND	ND
Naphthalene	0.21	0.52	0.45	0.16	ND	ND
Phenanthrene	0.66	0.72	2.60	1.40	0.22 J	23.00
Pyrene	0.55	1.10	1.70	2.20	0.94	56.00
Total Noncarcinogens	3.51	4.57	10.11	9.87	6.48	186.99
Volatile Organic Compounds						
Benzene						
Ethylbenzene						
Methylene Chloride						
Toluene						
Total Xylenes						
Total Volatile Compounds						

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-B-6-SB01	288E-M1501-SB01	288E-M1501-SB02
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	0.0.2.0	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	1.40	0.65	93.00
Benzo(a)Pyrene	1.50	0.60	67.00
Benzo(b)Fluoranthene	1.70	1.00	96.00
Benzo(k)Fluoranthene	ND	ND	41.00
Chrysene	1.60	0.80	92.00
Dibenz(a,h)Anthracene	0.27	ND	9.60
Indeno(1,2,3-cd)Pyrene	1.20	0.37	65.00
Total Carcinogens	7.67	3.42	463.60
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND	ND	ND
Acenaphthene	ND	0.05 J	0.52 J
Acenaphthylene	ND	ND	ND
Anthracene	0.10	0.10	7.60
Benzo(g,h,i)Perylene	1.40	0.41	52.00
bis(2-ethylhexyl)phthalate	ND	0.34	1.30 B
Butylbenzylphthalate	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND
Diethylphthalate	ND	ND	ND
Fluoranthene	1.30	1.30	150.00
Fluorene	ND	0.04 J	1.70
Hexachlorobenzene	ND	ND	ND
Naphthalene	0.29	0.18	5.10
Phenanthrene	0.60	0.66	37.00
Pyrene	1.30	1.30	110.00
Total Noncarcinogens	4.99	4.38	365.22
Volatile Organic Compounds			
Benzene			ND
Ethylbenzene			ND
Methylene Chloride			ND
Toluene			ND
Total Xylenes			ND
Total Volatile Compounds			ND

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID MATRIX COLLECTION METHOD DEPTH (feet)	288E-0306-WB01 Aqueous NA QA/QC	288E-0723-WB01 Aqueous NA QA/QC	288E-0724-WB01 Aqueous NA QA/QC	288E-0725-TB01 Aqueous NA QA/QC	288E-0725-WB01 Aqueous NA QA/QC	288E-0725-WB02 Aqueous NA QA/QC
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	ND	ND	ND		ND	ND
Benzo(a)Pyrene	ND	ND	ND		ND	ND
Benzo(b)Fluoranthene	ND	ND	ND		ND	ND
Benzo(k)Fluoranthene	ND	ND	ND		ND	ND
Chrysene	ND	ND	ND		ND	ND
Dibenz(a,h)Anthracene	ND	ND	ND		ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND		ND	ND
Total Carcinogens	ND	ND	ND		ND	ND
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND		ND	ND
Acenaphthene	ND	ND	ND		ND	ND
Acenaphthylene	ND	ND	ND		ND	ND
Anthracene	ND	ND	ND		ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND		ND	ND
bis(2-ethylhexyl)phthalate	ND	0.00	0.00		ND	0.02
Butylbenzylphthalate	ND	ND	ND		ND	ND
Di-n-Butylphthalate	ND	ND	ND		ND	ND
Di-n-Octyl Phthalate	ND	ND	ND		ND	ND
Diethylphthalate	ND	ND	ND		ND	ND
Fluoranthene	ND	ND	ND		ND	ND
Fluorene	ND	ND	ND		ND	ND
Hexachlorobenzene	ND	ND	ND		ND	ND
Naphthalene	ND	ND	ND		ND	ND
Phenanthrene	ND	ND	ND		ND	ND
Pyrene	ND	ND	ND		ND	ND
Total Noncarcinogens	ND	0.00	0.00		ND	0.02
Volatile Organic Compounds						
Benzene	ND			ND	ND	ND
Ethylbenzene	ND			ND	ND	ND
Methylene Chloride	2.40			ND	ND	ND
Toluene	ND			ND	ND	ND
Total Xylenes	ND			ND	ND	ND
Total Volatile Compounds	2.40			ND	ND	ND

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-2501-WB01	288E-TB-900801	288E-TB900802
MATRIX	Aqueous	Aqueous	Aqueous
COLLECTION METHOD			
DEPTH (feet)	NA	NA	NA
	QA/QC	QA/QC	QA/QC
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	ND		
Benzo(a)Pyrene	ND		
Benzo(b)Fluoranthene	ND		
Benzo(k)Fluoranthene	ND		
Chrysene	ND		
Dibenz(a,h)Anthracene	ND		
Indeno(1,2,3-cd)Pyrene	ND		
Total Carcinogens	ND		
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND		
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
bis(2-ethylhexyl)phthalate	0.00 J		
Butylbenzylphthalate	ND		
Di-n-Butylphthalate	ND		
Di-n-Octyl Phthalate	ND		
Diethylphthalate	ND		
Fluoranthene	ND		
Fluorene	ND		
Hexachlorobenzene	ND		
Naphthalene	ND		
Phenanthrene	ND		
Pyrene	ND		
Total Noncarcinogens	0.00		
Volatile Organic Compounds			
Benzene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Methylene Chloride	0.02	ND	ND
Toluene	ND	ND	ND
Total Xylenes	ND	ND	ND
Total Volatile Compounds	0.02	ND	ND

AKH000932

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

Summary of Analytical Results

NOTES

1. Depths are measured from the soil surface.

2. Explanation of abbreviations:

   HSAB: Hollow Stem Auger Boring
   HAB: Hand Auger Boring
   AQ: Aqueous
   NA: Not Applicable
   ND: Not Detected
   B: This flag is used when the analyte is found in the method blank as well as a sample. It indicates possible/probable laboratory contamination.
   J: Indicates an estimated value, based on an assumption of a 1:1 response factor for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

3. All concentrations are reported in parts per million (ppm).

0288E:PAA005D1.W51

AKH000922

APPENDIX C

Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

9459907 34

AKH000934

FMT001074

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0202-SB01	Soil	2-METHYLNAPHTHALENE	15.47	570
		BENZENE, 1,1'-OXYBIS-	17.4	27000
		BENZENE, 1,2,4-TRIMETHYL-	9.88	13000
		BICYCLO[2.2.1]HEPT-5-ENE-2,3- DICARBOXYL	26	37000
		DECANE	9.41	11000
		DIBENZOFURAN	19.35	79
		HEXACHLORO-, (ENDO,ENDO)-	26	37000
		NAPHTHALENE, 2-ETHENYL-	17	13000
		NONANE, 2-METHYL-5-PROPYL-	10.18	19000
		UNDECANE	11.59	22000
		UNKNOWN	10.82	15000
		UNKNOWN	8.67	16000
		UNKNOWN	10.62	21000
		UNKNOWN	9.24	27000
		UNKNOWN	8.51	29000
		UNKNOWN	6.36	31000
		UNKNOWN	6.18	32000
		UNKNOWN	6.9	98000
288E-0202-SB02	Soil	STYRENE	28.99	9
		STYRENE	28.99	9

AKH000935

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0308-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	5.59	3600
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	3.51	2900
		2-METHYLNAPHTHALENE	14.01	620
		3-HEXANONE	3.43	2200
		BENZENE, 1,2,3-TRIMETHYL-	7.9	620
		BENZENE, 1,2-DIMETHYL-	5.64	1400
		BENZENE, 1,2-DIMETHYL-	5.13	2700
		BENZENE, 2-ETHYL-1,4-DIMETHYL-	9.74	660
		BENZENE, ETHYL-	4.95	1400
		DECANE	8.11	510
		DECANE, 6-ETHYL-2-METHYL-	12.26	590
		DIBENZOFURAN	17.81	95
		DODECANE, 2,7,10-TRIMETHYL-	8.85	1200
		ETHANE, 1,2,2-TRICHLORO-1,1- DIFLUORO-	6.06	700
		HEPTANE, 2,2,3,4,6,6- HEXAMETHYL	9.27	880
		SULFUR, MOL. (S8)	25.15	4400
		UNDECANE	10.26	770

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0306-SB02	Soil	1-DECENE	7.05	55000
		2-BUTANONE	13.13	9600
		2-METHYLNAPHTHALENE	13.95	22000
		3-PENTEN-1-YNE, (E)-	8.4	37000
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	26.6	7000
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	8.88	180000
		BENZENE, 1,2-DIMETHYL-	5.11	73000
		BICYCLO[2.2.1]HEPT-2-ENE, 5- ETHENYL-	26.1	6100
		CARBON DISULFIDE	8.75	400
		CYCLOHEXANE, PENTYL-	10.97	180000
		CYCLOHEXANE, PROPYL-	6.45	69000
		CYCLOPENTANE, 1-METHYL-3- (2-METHYLP	7.77	59000
		DIBENZOFURAN	17.75	27000
		HEPTANE, 3-ETHYL-2-METHYL-	6.78	55000
		HEPTANE, 3-ETHYL-5-METHYL-	7.51	37000
		HEPTANE, 3-ETHYL-5-METHYL-	6.63	69000
		NONANE, 2,3-DIMETHYL	9.57	50000
		SULFUR, MOL. (S8)	25.13	190000
		UNDECANE, 5-METHYL-	10.64	190000
		UNKNOWN	33.39	1100
		UNKNOWN	24.24	1200
		UNKNOWN	34.4	3700
		UNKNOWN	35.99	3900
		UNKNOWN	27.88	5100
		UNKNOWN	29.78	10000
		UNKNOWN	18.66	96000
		UNKNOWN	19.35	110000
		VINYL ACETATE	16.15	880

AKH000937

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0502-SB01	Soil	1,1' :2',1''-TERPHENYL		23.87	4200
		2-METHYLNAPHTHALENE		14.59	1200
		2-PENTANONE, 3-METHYL-		3.18	2100
		2-PENTANONE, 3-METHYL-		3.33	72000
		2-PENTANONE, 4-METHYL-		3.86	2500
		BENZENE, 1,1'-	CYCLOHEXYL	26.26	19000
		BENZENE, 1,1'-OXYBIS-		16.49	1800
		BENZENE, ETHYL-		5.4	830
		BICYCLOHEXYL, 4-PHENYL-		25.8	16000
		BICYCLOHEXYL, 4-PHENYL-		25.21	25000
		PENTANE, 1,3-EPOXY-4-METHYL-		3.78	1600
		UNKNOWN		24.24	2900
		UNKNOWN		31.46	2900
		UNKNOWN		31.01	3700
		UNKNOWN		25.65	5700
		UNKNOWN		25.39	9500
		UNKNOWN (PHTHALATE)		35.16	3800
288E-0502-SB02	Soil	NO UNKNOWNS OR TICS		0	0
		NO UNKNOWNS OR TICS		0	0
288E-0603-SB01	Soil	2-HEXANONE, 4-HYDROXY-3-	PROPYL-	4.62	1600
		3-HEXANONE		4.52	1200
		BENZENE, 1,2-DIMETHYL-		6.93	2200
		BENZENE, 1,2-DIMETHYL-		6.39	5900
		BENZENE, 1-ETHYL-4-METHYL-		8.54	940
		BENZENE, ETHYL-		6.2	1500
		BENZENE, METHYL-		4.16	1500
		DECANE		9.42	1100
		HEPTANE, 4-ETHYL-2,2,6,6-	TETRAMETHY	10.63	1200
		OCTANE, 2,3,6-TRIMETHYL-		10.21	1100
		SULFUR, MOL. (S8)		26.95	3200
		UNDECANE		11.6	940
		UNDECANE, 3,6-DIMETHYL-		10.84	940
		UNKNOWN		11.1	1100
		UNKNOWN		3.91	1400

AKH000938

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0603-SB02	Soil	ACETONE	7.33	19
		CARBON DISLUFIDE	8.18	1
		UNKNOWN	27.83	7
		UNKNOWN	27.45	9
		UNKNOWN	21.46	12
		UNKNOWN	32.28	14
		UNKNOWN	25.86	25
288E-0603-SB03	Soil	1,1'-BIPHENYL	17.06	3000
		1,3,5-CYCLOHEPTATRIENE	4.14	590
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.6	1900
		2-METHYLNAPHTHALENE	15.52	96
		2-PENTANONE, 3-METHYL-	3.89	1700
		2-PENTANONE, 4-METHYL-	3.66	320
		2-PENTENE,3-ETHYL-4,4- DIMETHYL-	27.45	6
		3-HEXANONE	4.52	1900
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	10.01	550
		ACETONE	7.37	15
		BENZENE, 1,1'-OXYBIS-	17.5	17000
		BENZENE, 1,2-DIMETHYL-	6.92	350
		BENZENE, 1,2-DIMETHYL-	6.38	1700
		BENZENE, ETHYL-	6.19	710
		DIBENZOFURAN	19.4	41
		ETHANE, 1,1,2,2-TETRACHLORO-	7.37	390
		ETHANE, 1,1,2-TRICHLORO-	4.22	280
		HEXANE, 2,2,5,5-TETRAMETHYL-	10.64	470
		SULFUR, MOL. (S8)	27.02	7500
		UNKNOWN	25.86	5
		UNKNOWN	29.15	5
		UNKNOWN	26.17	6
		UNKNOWN	31.2	7
		UNKNOWN	11.42	14
		UNKNOWN	21.54	15
288E-0902-SB01	Soil	STYRENE	29.02	9

AKH000939

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0903-SB01	Soil	2-HEXANONE	4.61	2700
		2-PENTANONE, 3-METHYL-	3.9	2300
		2-PENTANONE, 4-METHYL-	3.87	410
		3-HEXANONE	4.52	1900
		5-HEXEN-2-ONE	4.34	330
		BENZENE, METHYL- (9CI)	4.15	200
		BICYCLO[4.2.0]OCTA-1,3,5- TRIENE	6.87	290
		DIBENZOFURAN	19.41	30
		ETHANE, 1,1,2-TRICHLORO-	4.22	410
		ETHANE,1,1,2,2-TETRACHLORO-	7.37	570
		UNKNOWN	25.33	570
288E-0903-SB02	Soil	NO UNKNOWNS OR TICS	0	0
288E-0904-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	6.87	640
		1,3,5-CYCLOHEPTATRIENE	4.15	720
		11H-BENZO(B)FLUORENE	28.96	1400
		2,3-PENTANEDIONE	3.87	340
		2-BUTANONE	3.89	1500
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.61	2300
		2-PENTANONE, 4-METHYL-	3.86	380
		3-HEXANONE	4.52	1900
		5-HEXEN-2-ONE	4.34	300
		9,10-ANTHRACENEDIONE	25.97	380
		BENZALDEHYDE, 3,5-DICHLORO-2- HYDROXY	25.33	640
		BENZO [E] PYRENE	35.5	2000
		BENZO(GHI)FLUORANTHENE	31	890
		DIBENZOFURAN	19.39	49
		ETHANE, 1,1,2-TRICHLORO-	4.22	420
		ETHANE,1,1,2,2-TETRACHLORO-	7.37	760
288E-0904-SB02	Soil	NO UNKNOWNS OR TICS	0	0
288E-0905-SB01	Soil	NO UNKNOWNS OR TICS	0	0

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1003-SB01	Soil	2-METHYLNAPHTHALENE	14.69	66
		2-OCTENE, 2,6-DIMETHYL-	7.65	1800
		2-PENTANONE, 3-METHYL-	3.29	3300
		2H-1,2,3-TRIAZOLE-4-CARBOXALD-EHYDE, 2-(	36.46	3900
		3-HEXANONE	3.89	2600
		BENZENE, 1,2-DIMETHYL-	6.21	930
		BENZENE, 1,2-DIMETHYL-	5.68	970
		DIBENZOFURAN	18.53	79
		HEPTANE, 3-ETHYL-2-METHYL-	7.36	1200
		NAPHTHALENE, DECAHYDRO-TRANS-	9.88	1700
		NONANE, 2,5-DIMETHYL-	9.17	970
		NONANE, 2,6-DIMETHYL-	9.22	2200
		NONANE, 3,7-DIMETHYL-	9.56	1200
		OCTANE, 3,6-DIMETHYL-	7.22	930
		OXIRANE, 2-METHYL-2-(1-METHYL-ETHYL)	3.97	3900
		UNDECANE, 5-METHYL-	10.12	900
		UNKNOWN	37.25	5700
288E-1305-SB01	Soil	1,4-METHANOAZULENE,DECAHYDRO-4,8,8-TRIME	17.24	510
		2-HEXANONE, 4-HYDROXY-3-PROPYL-	4.25	2000
		2-METHYLNAPHTHALENE	15.1	130
		2-PENTANONE, 3-METHYL-	3.56	1700
		3-HEXANONE	4.17	1800
		9H-FLUORENE-2-CARBONITRILE	37.74	12000
		BENZENE, METHYL-	3.82	550
		DECANE, 2,3,5-TRIMETHYL-	16.94	510
		DECANE, 3,6-DIMETHYL-	18.62	350
		DODECANE	13.28	710
		ETHANE, 1,1,2,2-TETRACHLORO-	6.98	590
		PENTADECANE, 2,6,10,14- TETRAMETHY	21.78	1500
		SULFUR, MOL. (S8)	26.48	9000
		TRIDECANE	15.18	550
		UNDECANE	11.26	750
		UNKNOWN	38.88	3600

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1306-SB01	Soil	2-HEPTANONE	10.58	920
		2-HEPTANONE	6.07	1700
		2-METHYLNAPHTHALENE	14.58	120
		2-NONANONE	14.53	710
		2-PENTANONE, 3-METHYL-	3.18	2800
		BENZENE, METHYL- (9CI)	3.43	580
		DIBENZOFURAN	18.4	45
		DODECANE	12.81	460
		ETHANE,1,1,2,2-TETRACHLORO-	8.53	670
		HEPTANE	3.79	2200
		HEXANOIC ACID, HEXYL ESTER	16.18	620
		PENTANAL, 2-METHYL-	3.87	3300
		SULFUR, MOL. (S8)	25.81	5800
		UNDECANE	10.79	540
		UNKNOWN (DIMETHYLSILOXANES)	36.46	1700
		UNKNOWN (DIMETHYLSILOXANES)	34.15	2400
		UNKNOWN (DIMETHYLSILOXANES)	35.34	2400
288E-1405-SB01	Soil	2-METHYLNAPHTHALENE	13.83	960
		BENZENE, 1,2,3-TRIMETHYL-	7.11	62000
		BENZENE, 1,2-DIMETHYL-	5.1	81000
		BENZENE, 1,2-DIMETHYL-	5.62	95000
		BENZENE, 1-ETHYL-2,4-DIMETHYL-	9.24	27000
		CYCLOHEXANE, (1-METHYLPROPYL)	8.65	33000
		CYCLOHEXENE, 1-(1-PROPYNYL)-	7.79	36000
		DECANE, 2,3,4-TRIMETHYL-	8.74	40000
		DECANE, 2,3,5-TRIMETHYL-	12.13	27000
		HEPTANE, 3,3-DIMETHYL-	8.03	62000
		NONANE, 2,6-DIMETHYL-	8.51	44000
		OCTANE, 2,3,7,-TRIMETHYL-	9.39	36000
		PENTANE, 2,3-DIMETHYL-	9.16	44000
		UNDECANE	10.18	70000
		UNKNOWN	3.08	44000
		UNKNOWN	4.91	95000

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1405-SB02	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	3.4	2700
		3-HEXANONE	3.33	2300
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	8.47	2600
		BENZENE, (1-METHYLETHYL)-	6.22	1100
		BENZENE, 1,2,3-TRIMETHYL-	8.39	590
		BENZENE, 1,2,3-TRIMETHYL-	7.76	1500
		BENZENE, 1,2-DIMETHYL-	5.5	2200
		BENZENE, ETHYL-	4.82	2100
		BENZENE,1-ETHYL-2-METHYL-	7.07	780
		BICYCLO[2.2.1]HEPT-2-ENE, 5- ETHENYL-	7.22	1200
		CYCLOPENTENE, 1-ETHENYL-3- METHYLENE-	5.03	10000
		DECANE, 2,5,9-TRIMETHYL-	7.97	640
		SULFUR, MOL. (S8)	25.15	64000
		UNDECANE	10.12	1100
		UNKNOWN	8.92	780

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1506-S801	Soil	1,3,5,7-CYCLOOCTATETRAENE	6.09	18000
		1,3,5,7-CYCLOOCTATETRAENE	6.09	18000
		11H-BENZO(B)FLUORENE	27.9	1200
		11H-BENZO(B)FLUORENE	27.9	1200
		2-METHYLNAPHTHALENE	14.59	2300
		2-METHYLNAPHTHALENE	14.59	2300
		4H-CYCLOPENTA[DEF]PHENANTHRENE	24.27	10000
		4H-CYCLOPENTA[DEF]PHENANTHRENE	24.27	10000
		BENZO(C)PHENANTHRENE	30.87	780
		BENZO(C)PHENANTHRENE	30.87	780
		BENZO[E]PYRENE	34.39	24000
		BENZO[E]PYRENE	34.39	24000
		CYCLOPENTA[CD]PYRENE	29.9	1000
		CYCLOPENTA[CD]PYRENE	29.9	1000
		DECANE, 2,2-DIMETHYL-	9.19	7300
		DECANE, 2,2-DIMETHYL-	9.19	7300
		DIBENZOFURAN	18.41	3400
		DIBENZOFURAN	18.41	3400
		HEXANE, 2,2,5-TRIMETHYL-	10.04	6900
		HEXANE, 2,2,5-TRIMETHYL-	10.04	6900
		NONANE, 3,7-DIMETHYL-	9.41	9300
		NONANE, 3,7-DIMETHYL-	9.41	9300
		PENTANE, 3-ETHYL-2,2-DIMETHYL-	9.83	13000
		PENTANE, 3-ETHYL-2,2-DIMETHYL-	9.83	13000
		SULFUR, MOL. (S8)	25.83	19000
		SULFUR, MOL. (S8)	25.83	19000

AKH000944

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1506-SB03	Soil	2-METHYLNAPHTHALENE	15.47	55
		2-METHYLNAPHTHALENE	15.47	55
		BENZENE, 1-METHYL-2-(1- METHYLETHY	11.93	15000
		BENZENE, 1-METHYL-2-(1- METHYLETHY	11.93	15000
		BENZENE, 2-ETHYL-1,4-DIMETHYL-	11.27	15000
		BENZENE, 2-ETHYL-1,4-DIMETHYL-	11.27	15000
		CYCLOHEXANE, PENTYL-	12.32	14000
		CYCLOHEXANE, PENTYL-	12.32	14000
		DECANE, 4-METHYL-	9.92	17000
		DECANE, 4-METHYL-	9.92	17000
		HEXANE, 2,2,5,5-TETRAMETHYL-	8.5	14000
		HEXANE, 2,2,5,5-TETRAMETHYL-	8.5	14000
		NAPHTHALENE, DECAHYDRO-2- METHYL-	11.84	7800
		NAPHTHALENE, DECAHYDRO-2- METHYL-	11.84	7800
		NONANE, 3,7-DIMETHYL-	10.28	24000
		NONANE, 3,7-DIMETHYL-	10.28	24000
		UNDECANE, 2,3-DIMETHYL-	12.62	8800
		UNDECANE, 2,3-DIMETHYL-	12.62	8800
		UNDECANE, 4-METHYL-	12.18	14000
		UNDECANE, 4-METHYL-	12.18	14000
		UNKNOWN (ALIPHATIC)	11.59	9000
		UNKNOWN (ALIPHATIC)	11.59	9000
		UNKNOWN (ALIPHATIC)	10.11	15000
		UNKNOWN (ALIPHATIC)	10.11	15000
		UNKNOWN (ALIPHATIC)	11.1	18000
		UNKNOWN (ALIPHATIC)	11.1	18000
		UNKNOWN (ALIPHATIC)	10.83	25000
		UNKNOWN (ALIPHATIC)	10.83	25000
		UNKNOWN (ALIPHATIC)	10.64	28000
		UNKNOWN (ALIPHATIC)	10.64	28000
		UNKNOWN (ALIPHATIC)	10.2	29000
		UNKNOWN (ALIPHATIC)	10.2	29000

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1507-SB01	Soil	1-OCTENE, 3,7-DIMETHYL-	7.8	1000
		2-PENTANONE, 3-METHYL-	3.34	2100
		3-UNDECENE, 6-METHYL-	7.51	850
		BENZENE, 1,1'-(1,2-ETHANEDIYL)BIS[3,4-DI	26.81	1200
		BENZENE, METHYL- (9CI)	3.6	1000
		CYCLOHEXANE, 1,1,2-TRIMETHYL-	5.06	1400
		HEPTANE	3.95	1900
		NONANE, 2,6-DIMETHYL-	9.37	1200
		OCTANE, 3,5-DIMETHYL-	7.99	1200
		OCTANE, 3,6-DIMETHYL-	7.34	1700
		OCTANE, 3-METHYL-	5.9	1200
		OCTANE, 4-METHYL-	5.73	800
		PENTANAL, 2,2-DIMETHYL-	4.03	2800
		SULFUR, MOL. (S8)	26.11	5800
		UNKNOWN	3.76	890
288E-1507-SB03	Soil	2-METHYLNAPHTHALENE	14.28	1200
		CYCLOOCTANE, BUTYL	4.38	13000
		CYCLOPENTANONE, 2-METHYL-4-(2-METHYLPROP	7.74	9200
		DODECANE, 2,7,10-TRIMETHYL-	20.66	16000
		DODECANE, 6-METHYL-	12.52	6900
		HEPTADECANE, 2,6,10,15- TETRAMETHY	16.92	7600
		HEPTANE, 3-ETHYL-2-METHYL-	6.77	12000
		NAPHTHALENE, DECAHYDRO-, TRANS-	9.22	11000
		NONANE, 2,6-DIMETHYL-	8.62	21000
		OCTANE, 3,6-DIMETHYL-	6.61	20000
		SULFUR, MOL. (S8)	25.07	31000
		TRIDECANE, 6-PROPYL-	22.11	22000
		UNKNOWN	7.46	9900
		UNKNOWN	8.76	11000
		UNKNOWN	6.19	12000
		UNKNOWN	8.96	13000
		UNKNOWN	36.98	5700
		UNKNOWN (ALIPHATIC)	36.23	3400
		UNKNOWN (ALIPHATIC)	28.9	3800

AKH000946

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1708-SB11	Soil	2-PENTANONE, 4-METHYL-	3.4	2200
		3-HEXANONE	3.33	1500
		ETHANE, 1,1,2-TRICHLORO-	3.05	300
		ETHANE,1,1,2,2-TETRACHLORO-	6.01	450
		SULFUR, MOL. (S8)	25.06	3200
		UNKNOWN	4.38	190
		UNKNOWN	3.15	300
288E-1708-SB03	Soil	UNKNOWN	3.23	19000
		HEPTANE, 4-ETHYL-	3.38	13000
		CYCLOHEXANE, 1,3-DIMETHYL-,CIS-	3.44	11000
		CYCLOPENTANE, 1-ETHYL-3-METHYL	3.64	9900
		CYCLOPENTANE, 1-ETHYL-2-METHYL-, CIS-	3.71	8800
		CYCLOHEXANE, 1,2-DIMETHYL-, -TRANS-	3.81	6700
		HEPTANE, 2,4-DIMETHYL-	3.90	9500
		HEPTANE, 2,6-DIMETHYL-	4.51	11000
		CYCLOPENTANE, 1-ETHYL-3-METHYL-, TRANS-	4.58	13000
		CYCLOHEXANE, 1,1,2-TRIMETHYL-	4.65	15000
		HEXANE, 2,3,4-TRIMETHYL-	5.30	10000
		2-DECENE, 5-METHYL-	5.47	11000
		CYCLOHEXENE, 1-METHYL-	6.48	6700
		OCTANE, 3,6-DIMETHYL-	6.90	6700
		2-METHYLNAPHTHALENE	14.31	770 J
		SULFUR, MOL. (S8)	25.47	24000
288E-1709-SB01	Soil	1,3,5-CYCLOHEPTATRIENE	3.58	330
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.01	2300
		2-METHYLNAPHTHALENE	14.69	160
		2-PENTANONE, 4-METHYL-	3.12	530
		3-HEXANONE	3.93	2100
		5-HEXEN-2-ONE	3.74	290
		BENZENE, METHYL(1-METHYLETHYL)	9.22	240
		BENZENE,1-ETHYL-2-METHYL-	7.8	200
		BENZO [E] PYRENE	34.58	2100
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	4.98	200
		DIBENZOFURAN	18.53	95

AKH000947

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
		ETHANE, 1,1,2-TRICHLORO-	3.64	330
		ETHANE,1,1,2,2-TETRACHLORO-	6.63	570
		HEPTANE, 2,6-DIMETHYL-	4.84	200
		OCTANE, 3,6-DIMETHYL-	7.21	240
		PENTANE, 2,3-DIMETHYL-	3.33	2100
		SULFUR, MOL. (S8)	26.03	31000
288E-1709-SB03	Soil	2-PENTANONE, 4-METHYL-	3.64	2600
		BENZENE, 1,1'-ETHYLIDENEBIS [3,4-DIMET	26.22	3300
		DOCOSANE	28.4	1500
		DODECANE,2,7,10-TRIMETHYL-	20.97	730
		ETHANE,1,1,2,2-TETRACHLORO-	6.29	500
		HEPTANE	3.55	1800
		HEXADECANE	27.28	1500
		HEXADECANE	30.5	1600
		IRON, TRICARBONYL[N-(PHENYL-2-PYRIDINYLM	29.46	1300
		PENTADECANE, 2,6,10,14- TETRAMETHY	26.12	1300
		SULFUR, MOL. (S8)	25.57	96000
		UNKNOWN	24.47	640
		UNKNOWN	36.62	1500
		UNKNOWN (SULFUR)	17.85	770
		UNKNOWN (SULFUR)	22.16	960
288E-M2401-SB22	Soil	ACETONE	7.37	37
		CARBON DISULFIDE	8.14	5
		ETHANE, 1,1,2-TRICHLORO-1,2,2 -TRIFLUORO	12.31	10

AKH000946

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2303-SB02	Soil	1-HEXENE, 4-METHYL-	7.11	25000
		2-METHYLNAPHTHALENE	13.85	870
		2-PENTENE,3-ETHYL-4,4- DIMETHYL-	27.47	96
		3,4-OCTADIENE7-METHYL-	23.92	31
		9-OXABICYCLO[6.1.0]NONANE, 1-METHYL-C	34.82	37
		ACETONE	7.39	26
		BENZENE, 1,2-DIETHYL-	10.46	57000
		BENZENE, 2-ETHENYL-1,4-DI- METHYL-	11.13	28000
		BENZENE, METHYL(1- METHYLETHY	9.83	33000
		BICYCLO[4.1.0]HEPTANE, 3,7,7- TRIMETHYL-	28.09	68
		CYCLOHEXANE, (1-METHYLPROPYL)-	8.67	38000
		CYCLOHEXANE, 1,1,3,5- TETRAMETHY	31.73	280
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	26.12	100
		CYCLOHEXANE, 1,1-DIMETHYL-	21.79	17
		CYCLOHEXANE, 1,2,4-TRIMETHYL-,(1.ALPHA.,	26.78	39
		CYCLOPENTANE, 2-ISOPROPYL- 1,3-DIMETH	29.99	70
		DIBENZOFURAN	17.65	270
		DODECANE, 2,7,10-TRIMETHYL-	8.87	23000
		HEXANE, 2,3,4-TRIMETHYL-	8.78	65000
		NAPHTHALENE, DECAHYDRO-, CIS-	35.44	110
		NORBORNANE, 2-ISOBUTYL-	33.35	100
		OCTANE, 2,2,6-TRIMETHYL-	7.59	25000
		OCTANE, 2,3,6-TRIMETHYL-	11.49	40000
		PENTALENE, OCTAHYDRO-2-METHYL-	26.43	23
		PENTANE, 3,3-DIMETHYL-	10.12	27000
		SULFUR, MOL. (S8)	25.01	91000
		TETRADECANE, 1-IODO-	8.56	41000
		TRICYCLO [3.3.1.13,7] DECANE	25.11	11
		UNKNOWN	32.38	39
		UNKNOWN	29.13	54
		UNKNOWN	9.41	44000
		UNKNOWN	9.19	100000
		UNKNOWN (AROMATIC FLAVOR)	10.89	57000

AKH000949

945990749

FI 01089

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2503-SB02	Soil	1,3,5-CYCLOHEPTATRIENE	4.18	12000
		2,3-HEPTADIEN-5-YNE, 2,4- DIMETHYL-	8.65	37000
		2,3-HEPTADIEN-5-YNE, 2,4-DI- METHYL-	8.74	2500
		2-HEXANONE, 4-HYDROXY-5-METHYL-3-PROPYL-	4.6	2500
		2-METHYLNAPHTHALENE	15.51	150
		2-PENTANONE, 3-METHYL-	3.9	1400
		3-HEXANONE	4.52	1800
		5-HEXEN-2-ONE	4.34	1000
		ACETONE	7.61	26
		BENZENE, 1,2-DIMETHYL-	6.38	1100
		BENZENE, 1-ETHENYL-3-METHYL-	9.38	4100
		BENZENE, 1-METHYL-4-PROPYL-	10.65	440
		BENZENE, ETHYL-	6.19	2400
		DIBENZOFURAN	19.39	62
		ETHANE, 1,1,2,2-TETRACHLORO-	7.36	740
		ETHANE, 1,1,2-TRICHLORO-	4.22	1700
		SULFUR, MOL. (S8)	26.97	1600
		UNKNOWN	3.87	390
288E-2601-SB01	Soil	2-METHYLNAPHTHALENE	15.54	63
		3-HEXANONE	4.52	2000
		BENZENE, 1,2,3,4-TETRAMETHYL-	12.74	400
		BENZENE, 1,2,3,4-TETRAMETHYL-	11.98	670
		BENZENE, 1,2-DIMETHYL-	6.4	620
		BENZENE,1-ETHYL-2-METHYL-	8.55	580
		DECANE, 2,6,7-TRIMETHYL-	10.3	840
		DECANE, 4-METHYL-	9.95	760
		ETHANE,1,1,2,2-TETRACHLORO-	7.38	580
		HEPTANE, 2,2,3,4,6,6-HEXA- METHYL-	10.66	890
		NAPHTHALENE, DECAHYDRO-2- METHYL-	11.88	530
		NONANE, 3-METHYL-5-PROPYL-	10.22	1200
		OCTANE, 2,3,6-TRIMETHYL-	12.99	490
		OXIRANE, 2-METHYL-2-(1-METHYL-ETHYL)	4.62	2900
		UNKNOWN	3.87	620
		UNKNOWN	3.9	1800

AKH000950

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2601-SB02	Soil	4,5-NONADIENE, 2-METHYL-	32.36	19
		4,5-NONADIENE, 2-METHYL-	32.36	19
		4-METHYL-2-PENTANONE	26.37	21
		4-METHYL-2-PENTANONE	26.37	21
		ACETONE	7.37	17
		ACETONE	7.37	17
		CYCLOPENTANE, (2-METHYLBUTYL)	31.74	24
		CYCLOPENTANE, (2-METHYLBUTYL)	31.74	24
		NAPHTHALENE, DECAHYDRO-	35.37	120
		NAPHTHALENE, DECAHYDRO-	35.37	120
		UNKNOWN	31.12	8
		UNKNOWN	31.12	8
		UNKNOWN	33.36	15
		UNKNOWN	33.36	15
288E-2602-SB01	Soil	4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	8.44	1500000
		BENZENE, 1,2-DIMETHYL-	4.96	1600000
		DECANE	7.95	1800000
		DECANE, 2,2,8-TRIMETHYL-	7.52	880000
		DECANE, 2,5,9-TRIMETHYL-	8.79	1300000
		HEPTANE, 2,2,3,4,6,6- HEXAMETHYL	7.05	2000000
		HEPTANE, 2,2,4,6,6-PENTAMETHYL-	8.62	2000000
		HEPTANE, 5-ETHYL-2-METHYL-	9.13	6000000
		HEXANE, 2,3,4-TRIMETHYL-	8.7	5500000
		NONANE, 3,7-DIMETHYL-	9.35	4100000
		OCTANE, 2,3,6-TRIMETHYL-	11.41	990000
		OCTANE, 6-ETHYL-2-METHYL-	9.85	930000
		PENTANE, 3-ETHYL-2,2-DIMETHYL-	8.49	3000000
		UNDECANE	10.11	4700000
		UNKNOWN	9.61	930000
288E-2602-SB02	Soil	2-BUTANONE	13.16	9400
		VINYL ACETATE	16.18	720

AKH000951

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2603-SB01	Soil	1-HEXENE, 4-METHYL-	7.77	110000
		1-HEXENE, 4-METHYL-	7.56	120000
		1-HEXENE, 4-METHYL-	7.31	180000
		DECANE, 2,2,3-TRIMETHYL-	10.77	290000
		DECANE, 3,3,5-TRIMETHYL-	11.12	120000
		HEPTANE, 2,4-DIMETHYL-	7.66	60000
		HEPTANE, 4-ETHYL-2,2,6,6- TETRAMETHY	10.89	210000
		HEXANE, 2,2,5,5-TETRAMETHYL-	10.11	110000
		NONANE, 2,6-DIMETHYL-	8.04	83000
		NONANE, 2,6-DIMETHYL-	9.48	300000
		OCTANE, 2,3,6-TRIMETHYL-	11.71	230000
		OCTANE, 2,4,6-TRIMETHYL-	7.97	120000
		OXIRANE, (1-METHYLETHYL)-	8.83	190000
		UNKNOWN (ALKYL)	9.67	180000
		UNKNOWN (ALKYL)	9.05	260000
288E-2603-SB02	Soil	1-BUTANOL	15.4	170
		3-TETRADECENE, (Z)-	29.15	180
		ACETONE	7.37	29
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	26.13	150
		CYCLOHEXANE, 1,1-DIMETHYL-	21.81	81
		CYCLOHEXANE, 1,2,3-TRIMETHYL-	27.45	160
		CYCLOHEXANE, 1,2,4-TRIMETHYL-	30.23	240
		CYCLOHEXANE, 1,3,5-TRIMETHYL-,(1.ALPHA.,	31.12	43
		CYCLOHEXANE, 1-ETHYL-2- METHYL-, C	29.96	180
		CYCLOHEXANE, ISOCYANATO-	26.41	72
		OCTANE, 3-METHYL-	32.47	65
		UNKNOWN	31.86	62
		UNKNOWN	26.41	72
		UNKNOWN	26.87	140
		UNKNOWN	33.25	180
		UNKNOWN	28.22	290
		UNKNOWN	24.63	430

AKH000952

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2604-SB01	Soil	1-HEXENE, 3,4-DIMETHYL-	8.23	53000
		CYCLOHEXANE, (1,2-DIMETHYL- BUTYL)-	9.01	29000
		HEXANE, 3,3-DIMETHYL- (8CI9CI)	11.16	33000
		OCTANE, 2,4,6-TRIMETHYL-	9.96	110000
		UNDECANE, 3-METHYL-	9.71	150000
		UNDECANE, 5-METHYL-	7.77	38000
		UNKNOWN	7.11	62000
		UNKNOWN	11.59	72000
		UNKNOWN	8.78	100000
		UNKNOWN	9.46	110000
		UNKNOWN	9.24	150000
		UNKNOWN	29.18	200000
		UNKNOWN	29.04	320000
		UNKNOWN (ALKYL)	10.34	47000
		UNKNOWN (ALKYL)	11.52	110000
288E-2604-SB02	Soil	1,4-UNDECADIENE, (Z)-	33.36	69
		1-UNDECYNE	32.28	54
		4,5-NONADIENE, 2-METHYL-	30.69	26
		4,7-METHANO-1H, 3A,4,7,7A- TETRAHYDRO	24.7	470
		9-OCTADECYNE	34.71	40
		ACETONE	7.37	15
		BICYCLO[2.2.1]HEPTANE, 2,2,3- TRIMETHYL-	27.56	44
		CYCLOHEXANE, 1,1,3,5- TETRAMETHY	31.74	140
		OXONIN, 4,5,6,7-TETRAHYDRO-, (Z,Z)-	28.1	64
		TRICYCLO[3.3.1.13,7]DECANE, 1-NITRI-	29.15	56
		UNKNOWN	35.1	28
		UNKNOWN	35.22	38

AKH000953

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2802-SB01	Soil	1,1'-BIPHENYL	16.12	22000
		2-METHYLNAPHTHALENE	14.58	3400
		2-PENTANONE, 4-METHYL-	3.87	1900
		BENZENE, 1,1'-OXYBIS-	16.57	73000
		BENZENE, 1,2,3,4-TETRAMETHYL-	11.18	3800
		BENZENE, 1,2,3-TRIMETHYL-	8.43	1900
		BENZENE, 1,2,4,5-TETRAMETHYL-	11.1	2300
		BENZENE, 1,2,4-TRIMETHYL-	9.06	2000
		BENZENE, 1,2-DIMETHYL-	5.58	4400
		BENZENE, 1,4-DIMETHYL-2-(1- METHYLETHY	12.75	1800
		BENZENE, 1-METHYL-3- (1-METHYLE	11.84	1700
		DIBENZOFURAN	18.41	520
		HEXANE, 2,2,5-TRIMETHYL-	9.82	2200
		NAPHTHALENE, 1,8-DIMETHYL-	16.83	2700
		NAPHTHALENE, 1-METHYL-	14.89	3100
		UNDECANE	10.8	2200
		UNDECANE, 3,6-DIMETHYL-	10.04	2300
288E-2802-SB11	Soil	2-METHYLNAPHTHALENE	14.83	140
		2-PENTANONE, 3-METHYL-	3.34	1800
		2-PENTANONE, 4-METHYL-	4.03	2100
		BENZENE, 1,1'-OXYBIS-	16.77	11000
		BENZENE, 1,2-DIMETHYL-	5.79	1800
		BENZENE, 1,3-DIMETHYL-	6.32	640
		BENZENE, ETHYL-	5.6	480
		BENZENE, METHYL-	3.6	600
		BENZO[E]PYRENE	34.68	1800
		DECANE	8.86	440
		DECANE, 6-ETHYL-2-METHYL-	11.03	480
		DIBENZOFURAN	18.68	130
		ETHANE, 1,1,2,2-TETRACHLORO-	6.75	360
		HEPTANE	3.95	1400
		NAPHTHALENE, 2-ETHENYL-	16.36	2600
		NONANE, 2,6-DIMETHYL-	9.37	480
		SILANE, METHYLTRIPHENOXY-	36.18	880

AKH000954

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-1-SB01	Soil	1,5-HEPTADIEN-3-YNE		3.83	4700
		2-METHYLNAPHTHALENE		15.11	110
		3-HEXANONE		4.18	2100
		BENZENE, 1,2-DIMETHYL-		6.02	1300
		DECANE, 2,2,4-TRIMETHYL-		9.64	770
		DECANE, 2,2,6-TRIMETHYL-		12.7	650
		DIBENZOFURAN		18.97	60
		DODECANE, 2,7,10-TRIMETHYL-		12.63	820
		HEPTANE, 2,2,3,4,6,6-	HEXAMETHYL	10.3	1100
		HEXADECANE		21.68	1200
		NONACOSANE		18.61	520
		NONANE, 3-METHYL-5-PROPYL-		9.87	770
		OXIRANE, 2,3-DIMETHYL-		3.57	1900
		PENTANAL, 2-METHYL-		4.27	2200
		PENTANE, 3,3-DIMETHYL-		10.77	650
		UNDECANE		11.27	770
		UNDECANE, 3,6-DIMETHYL-		10.51	820
288E-B-1-SB11	Soil	2-HEXANONE, 4-HYDROXY-3-	PROPYL-	4.01	4500
		3-HEXANONE		3.93	2900
		4H-CYCLOPENTA[DEF]PHENANTHRENE		24.4	7200
		7H-BENZ[DE]ANTHRACEN-7-ONE		29.64	1400
		BENZO(C)PHENANTHRENE		31.06	1000
		BENZO(J)FLUORANTHENE		34.18	12000
		BENZO(J)FLUORANTHENE		34.6	36000
		BENZO[B]NAPHTHO[1,2-D]	THIOPHENE	29.96	1000
		UNKNOWN		3.34	3600
		UNKNOWN		25.08	7200
		UNKNOWN (AROMATIC)		28.45	1000
		UNKNOWN (AROMATIC)		30.28	1000
		UNKNOWN (AROMATIC)		28.05	1400
		UNKNOWN (AROMATIC)		30.08	1600
		UNKNOWN (AROMATIC)		37.33	11000

AKH000955

945990755

FI 01095

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-1-SB02	Soil	ACETONE	6.42	19
		XYLENE (TOTAL) (M-XYLENE)	29.16	12
		XYLENE (TOTAL) (O+P XYLENE)	29.85	14
288E-B-1-SB03	Soil	1,3-CYCLOPENTADIENE, 5-(1- METHYLETHY	6.23	4300
		2-METHYLNAPHTHALENE	14.69	120
		2-PENTANONE, 3-METHYL-	3.33	2600
		3-HEXANONE	3.92	2300
		BENZENE, 1,3-DIMETHYL-	5.71	6900
		DECANE, 2,2,6-TRIMETHYL-	12.31	3000
		DECANE, 3,3,6-TRIMETHYL-	10.38	2900
		DIBENZOFURAN	18.53	250
		HEXANE, 2,2,3-TRIMETHYL-	9.26	4500
		NONANE, 3,7-DIMETHYL-	10.12	4700
		NONANE, 3-METHYL-5-PROPYL-	9.48	3600
		OCTANE, 2,2,6-TRIMETHYL-	7.82	2500
		OCTANE, 2,6-DIMETHYL-	9.91	4800
		OXIRANE, 2-METHYL-2-(1- METHYLETHY	4	2900
		UNDECANE	10.88	2200
		UNKNOWN	3.62	17000
		UNKNOWN (ALIPHATIC)	12.24	3700

AKH000956

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-2-SB01	Soil	2-HEXANONE, 4-HYDROXY-3-	PROPYL-	3.86	1600
		2-METHYLNAPHTHALENE		14.46	130
		2-PENTANONE, 3-METHYL-		3.22	1200
		3-HEXANONE		3.79	1200
		BENZENE, 1,2-DIMETHYL-		5.35	1200
		BENZENE, 1,2-DIMETHYL-		6.05	1700
		BENZENE, 1,2-DIMETHYL-		5.53	5700
		BENZO(J)FLUORANTHENE		33.66	2000
		BENZO[A]PYRENE		34.31	2600
		DECANE		8.54	1300
		DIBENZOFURAN		18.3	160
		HEXANE, 2,2,5-TRIMETHYL-		9.72	2100
		NONANE, 3-METHYL-5-PROPYL-		9.29	1800
		OCTANE, 2,2,6-TRIMETHYL-		9.93	1300
		OCTANE, 2,6,6-TRIMETHYL-		10.18	940
		UNDECANE		10.69	1800
		UNKNOWN		36.19	2300
288E-B-2-SB02	Soil	1,3-ISOBENZOFURANDIONE		14.9	4300
		1-OCTENE, 3,7-DIMETHYL-		7.57	3300
		2-METHYLNAPHTHALENE		14.58	280
		BENZENE, 1,2,3-TRIMETHYL-		9.08	3500
		BENZENE, 1,2-DIMETHYL-		6.12	4100
		BENZENE, 1,2-DIMETHYL-		5.59	9200
		BENZENE, 1-METHYL-2-(1-	METHYLETHY	9.9	4000
		CYCLOHEXANE, (1-METHYLPROPYL)		9.31	3100
		DECANE, 3,4-DIMETHYL-		10.04	7600
		DODECANE,2,7,10-TRIMETHYL-		9.41	7400
		HEPTANE, 2,2,3,4,6,6-HEXA-	METHYL-	9.82	9900
		NONANE, 2,6-DIMETHYL-		9.14	8400
		OCTANE, 4-ETHYL-		8.64	11000
		UNDECANE		12.81	2700
		UNDECANE		10.81	13000
		UNDECANE, 5-METHYL-		11.17	3200

AKH000957

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-2-SB03	Soil	1,3,5,7-CYCLOOCTATETRAENE	5.53	330
		BENZENE, 1,2-DIMETHYL-	5.06	370
		ETHANE, 1,1,2,2 TETRACHLORO-	6.01	370
		ETHANE, 1,1,2-TRICHLORO-	3.04	250
		PENTANE, 1,3-EPOXY-4-METHYL-	3.33	2000
		SULFUR, MOL. (S8)	25.07	4500
		UNKNOWN	3.15	370
		UNKNOWN	3.4	2700
		UNKNOWN (DIMETHYLSILOXANES)	33.53	250
		UNKNOWN (DIMETHYLSILOXANES)	36.91	330
		UNKNOWN (DIMETHYLSILOXANES)	34.72	780
		UNKNOWN (DIMETHYLSILOXANES)	35.83	860
288E-B-3-SB01	Soil	2-METHYLNAPHTHALENE	13.97	290
		3-HEXANONE	3.32	1700
		BENZO [E] PYRENE	33.61	540
		DECANE, 2,3,5-TRIMETHYL-	15.88	740
		DIBENZOFURAN	17.77	67
		DODECANE,2,7,10-TRIMETHYL-	20.66	660
		ETHANE,1,1,2,2-TETRACHLORO-	6.01	540
		HEPTADECANE	20.56	1100
		HEXADECANE	17.52	700
		SULFUR, MOL. (S8)	25.06	1900
		TETRADECANE	23.3	430
		TRIDECANE	14.11	970
		TRIDECANE, 6-PROPYL-	19.09	430
		UNDECANE	12.25	660
		UNKNOWN	35.5	1000
		UNKNOWN	36.21	2100
		UNKNOWN	3.41	2600

AKH000958

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-3-SB03	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	4	3000
		2-PENTANONE, 3-METHYL-	3.34	2800
		2-PENTANONE, 4-METHYL-	3.12	680
		3-HEXANONE	3.92	2600
		5-HEXEN-2-ONE	3.74	430
		BENZO [E] PYRENE	33.91	23000
		CYCLOPENT[A]INDENE, 3,8-DI- HYDRO-1,2,	26.7	6300
		ETHANE, 1,1,2-TRICHLORO-	3.64	480
		ETHANE,1,1,2,2-TETRACHLORO-	6.64	770
		HEPTACOSANE	29.92	1300
		HEXATRIACONTANE	32.93	2300
		PHENANTHRENE, 1-METHYL-7-(1- METHYLETHY	28.13	22000
		SULFUR, MOL. (S8)	26.09	53000
		UNKNOWN	25.75	7200
		UNKNOWN (SULFUR)	22.72	1100
288E-B-4-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	5.55	490
		1-PHENANTHRENECARBOXYLIC ACID,1,2,3,4,4A	28.81	2300
		2-HEXANONE	3.4	2600
		2-METHYLNAPHTHALENE	13.97	140
		BENZO [E] PYRENE	33.59	1100
		DIBENZOFURAN	17.76	250
		HEPTANE	3.33	1700
		SULFUR, MOL. (S8)	25.05	610
		UNKNOWN	24.23	450
		UNKNOWN	24.89	490
		UNKNOWN	27.35	2100
		UNKNOWN (DIMETHYLSILOXANES)	29.46	660
		UNKNOWN (DIMETHYLSILOXANES)	35.83	1100
		UNKNOWN (DIMETHYLSILOXANES)	30.92	1400
		UNKNOWN (DIMETHYLSILOXANES)	34.72	1800
		UNKNOWN (DIMETHYLSILOXANES)	32.27	2000
		UNKNOWN (DIMETHYLSILOXANES)	33.54	2000

AKH000959

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-5-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	6.29	1300
		1,3,5,7-CYCLOOCTATETRAENE	6.29	1300
		2-METHYLNAPHTHALENE	14.86	88
		2-METHYLNAPHTHALENE	14.86	88
		2-PENTANONE, 3-METHYL-	3.33	820
		2-PENTANONE, 3-METHYL-	3.33	820
		BENZENE, 1,2-DIMETHYL-	6.34	410
		BENZENE, 1,2-DIMETHYL-	6.34	410
		BENZENE, 1,2-DIMETHYL-	5.8	700
		BENZENE, 1,2-DIMETHYL-	5.8	700
		BENZENE, METHYL-	3.6	580
		BENZENE, METHYL-	3.6	580
		BENZO(J)FLUORANTHENE	34.7	2500
		BENZO(J)FLUORANTHENE	34.7	2500
		BENZO[B]NAPHTHO[2,3-D]FURAN	27.13	530
		BENZO[B]NAPHTHO[2,3-D]FURAN	27.13	530
		DECANE, 2,6,8-TRIMETHYL-	11.05	660
		DECANE, 2,6,8-TRIMETHYL-	11.05	660
		DIBENZOFURAN	18.71	80
		DIBENZOFURAN	18.71	80
		OXIRANE, 2-METHYL-2-(1- METHYLETHY	4.04	740
		OXIRANE, 2-METHYL-2-(1- METHYLETHY	4.04	740
		PENOXALINE	26.26	660
		PENOXALINE	26.26	660
		PENTANE, 1,3-EPOXY-4-METHYL-	3.96	1200
		PENTANE, 1,3-EPOXY-4-METHYL-	3.96	1200
		UNDECANE	13.07	450
		UNDECANE	13.07	450
		UNKNOWN	37.38	2300
		UNKNOWN	37.38	2300
		UNKNOWN (DIMETHYLSILOXANES)	33.17	1200
		UNKNOWN (DIMETHYLSILOXANES)	34.45	1200
		UNKNOWN (DIMETHYLSILOXANES)	33.17	1200
		UNKNOWN (DIMETHYLSILOXANES)	34.45	1200

AKH000960

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-5-SB03	Soil	1,2-BENZENEDICARBOXYLIC ACID, ISODECYL O	35.16	2200
		1,2-BENZENEDICARBOXYLIC ACID, ISODECYL O	35.16	2200
		2-PENTANONE, 3-METHYL-	3.34	1800
		2-PENTANONE, 3-METHYL-	3.34	1800
		BENZO(J)FLUORANTHENE	34.26	1100
		BENZO(J)FLUORANTHENE	34.26	1100
		BENZO(J)FLUORANTHENE	34.68	2400
		BENZO(J)FLUORANTHENE	34.68	2400
		DIBENZO[DEF,MNO]CHRYSENE	37.43	1200
		DIBENZO[DEF,MNO]CHRYSENE	37.43	1200
		HEPTANE	3.95	1600
		HEPTANE	3.95	1600
		PENTANAL, 2-METHYL-	4.03	2100
		PENTANAL, 2-METHYL-	4.03	2100
		UNKNOWN (AROMATIC)	42	1200
		UNKNOWN (AROMATIC)	42	1200
		UNKNOWN (DIMETHYLSILOXANES)	18.39	400
		UNKNOWN (DIMETHYLSILOXANES)	18.39	400
		UNKNOWN (PHTHALATE)	32.35	1500
		UNKNOWN (PHTHALATE)	32.35	1500
		UNKNOWN (PHTHALATE)	31.4	1800
		UNKNOWN (PHTHALATE)	32.12	1800
		UNKNOWN (PHTHALATE)	31.4	1800
		UNKNOWN (PHTHALATE)	32.12	1800
		UNKNOWN (PHTHALATE)	32.51	2500
		UNKNOWN (PHTHALATE)	32.51	2500
		UNKNOWN (PHTHALATE)	32.55	2900
		UNKNOWN (PHTHALATE)	32.55	2900
		UNKNOWN (PHTHALATE)	31.96	3800
		UNKNOWN (PHTHALATE)	31.96	3800

3.5

AKH000961

945990761

FN 01101

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-6-SB01	Soil	2-METHYLNAPHTHALENE	14.58	59
		2-PENTANONE, 3-METHYL-	3.19	2300
		5-HEXEN-2-ONE	3.6	320
		BENZENE, 1,2-DIMETHYL-	5.58	200
		BENZENE, METHYL- (9CI)	3.43	640
		BENZO [E] PYRENE	33.71	1600
		BENZO[E]PYRENE	34.36	1700
		ETHANE, 1,1,2-TRICHLORO-	3.49	320
		ETHANE,1,1,2,2-TETRACHLORO-	6.53	680
		HEPTADECANE, 2,6,10,15-TETRAMETHYL-	18.11	240
		HEPTANE	3.78	1900
		PENTANAL, 2-METHYL-	3.87	2800
		SULFUR, MOL. (S8)	25.8	4800
		UNKNOWN	36.99	990
		UNKNOWN	36.24	1500
		UNKNOWN (ALKYL)	9.82	160
288E-M1501-SB01	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.61	1700
		2-HEXANONE, 6-BROMO-	4.34	190
		2-PENTANONE, 3-METHYL-	3.89	1100
		2-PENTANONE, 4-METHYL-	3.66	270
		3-HEXANONE	4.52	1700
		3-PENTANONE, 2-METHYL-	3.86	310
		BENZENE, 1,2-DIMETHYL-	6.39	150
		BENZENE, METHYL-	4.15	390
		BENZO[E]PYRENE	35.52	540
		DIBENZOFURAN	19.41	44
		DODECANE	13.65	150
		DODECANE, 2,6,10-TRIMETHYL-	19	310
		ETHANE, 1,1,2,2-TETRACHLORO-	7.38	310
		ETHANE, 1,1,2-TRICHLORO-	4.23	310
		TRIDECANE, 6-PROPYL-	20.57	190
		TRITETRACONTANE	17.32	310

AKH000962

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-M1501-SB02	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	3.38	23000
		2-METHYLNAPHTHALENE	13.83	390
		3-HEXANONE	3.31	20000
		5-HEXEN-2-ONE	3.14	3300
		7H-BENZ[DE]ANTHRACEN-7-ONE	28.63	2600
		ACETONE	7.33	170
		BENZENE, 1,2-DIMETHYL-	4.97	3300
		BENZO(C)PHENANTHRENE	29.07	3300
		BENZO(J)FLUORANTHENE	32.9	41000
		BENZO[B]NAPHTHO[2,3-D]FURAN	26	4100
		BENZO[E]PYRENE	33.55	36000
		DIBENZOFURAN	17.63	1100
		ETHANE, 1,1,2,2-TETRACHLORO-	5.91	4800
		ETHANE, 1,1,2-TRICHLORO-1,2,2 -TRIFLUORO	12.31	12
		NAPHTHALENE, 2-PHENYL-	24.13	10000
		PENTACOSANE	30.05	4800
		SULFUR, MOL. (S8)	25.03	240000
		TRIPHENYLENE, 2-METHYL-	31	2200
		UNKNOWN	26.83	6
		UNKNOWN	12.66	40
		UNKNOWN (AROMATIC FLAVOR)	36.19	13000
288E-0725-TB01	Aqueous	ACETONE	6.36	12
		ACETONE	6.36	12
		CARBON DISULFIDE	7.29	2
		CARBON DISULFIDE	7.29	2
288E-TB-900801	Aqueous	ACETONE	7.47	30
288E-0306-WB01	Aqueous	NO UNKNOWNS OR TICS	0	0
		NO UNKNOWNS OR TICS	0	0
288E-2501-WB01	Aqueous	2,3-PENTANEDIONE	3.31	27
		5,-HEXEN-2-ONE	3.13	6
		PENTANAL, 2-METHYL-	3.38	31
		UNKNOWN	28.91	31

AKH000963

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2501-WB01	Aqueous	2,3-PENTANEDIONE	3.31	27
		5-HEXEN-2-ONE	3.13	6
		PENTANAL, 2-METHYL-	3.38	31
		UNKNOWN	28.91	31
288E-TB900802	Aqueous	ACETONE	7.82	80
288E-0723-WB01	Aqueous	2-PENTANONE, 4-METHYL-	3.27	7
		2-PROPANONE, 1-CYCLOPROPYL	3.94	4
		3-HEXANONE	4.13	29
		3-PENTANOL, 3-METHYL-	3.48	54
		BENZENE, METHYL- (9CI)	3.76	7
		PROPANE, 2-ETHOXY-2-METHYL-	3.14	13
		UNKNOWN	4.46	4
		UNKNOWN	4.21	44
		UNKNOWN (DIMETHYLSILOXANES)	34.78	4
288E-0724-WB01	Aqueous	2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.19	52
		2-PENTANONE, 3-METHYL-	3.49	57
		2-PENTANONE, 4-METHYL-	3.27	8
		2-PROPANONE, 1-CYCLOPROPYL	3.93	5
		3-HEXANONE	4.11	36
		BENZENE, METHYL- (9CI)	3.75	8
		UNKNOWN	3.14	11
		UNKNOWN (DIMETHYLSILOXANES)	37.99	17
		UNKNOWN (DIMETHYLSILOXANES)	34.35	20
288E-0725-WB01	Aqueous	2-HEXANONE	4.2	11
		2-PENTANONE, 3-METHYL-	3.49	8
		3-HEXANONE	4.1	19
		3-PENTANONE, 2-METHYL-	3.47	6
		BENZENE, METHYL-	3.75	8
		NO UNKNOWNS OR TICS	0	0
		NO UNKNOWNS OR TICS	0	0
		UNKNOWN (DIMETHYLSILOXANES)	33.45	5
		UNKNOWN (DIMETHYLSILOXANES)	34.73	14

AKH000964

AKH000965

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0725-WB01	Aqueous	UNKNOWN (DIMETHYLSILOXANES)	35.92	26
		UNKNOWN (DIMETHYLSILOXANES)	41.78	29
		UNKNOWN (DIMETHYLSILOXANES)	37.07	40
		UNKNOWN (DIMETHYLSILOXANES)	39.9	43
		UNKNOWN (DIMETHYSILOXANES)	38.37	46
288E-0725-WB02	Aqueous	1,3,5-CYCLOHEPTATRIENE	3.75	8
		2-HEXANONE	4.2	9
		2-PENTANONE, 3-METHYL-	3.5	8
		3-HEXANONE	4.11	18
		3-PENTANONE, 2-METHYL-	3.47	4
		NO UNKNOWNS OR TICS	0	0
		NO UNKNOWNS OR TICS	0	0
		UNKNOWN (DIMETHYLSILOXANES)	34.41	5
		UNKNOWN (DIMETHYLSILOXANES)	34.73	8
		UNKNOWN (DIMETHYLSILOXANES)	35.91	8
		UNKNOWN (DIMETHYLSILOXANES)	37.08	10
		UNKNOWN (DIMETHYLSILOXANES)	39.9	11
		UNKNOWN (DIMETHYLSILOXANES)	41.75	18
		UNKNOWN (DIMETHYSILOXANES)	38.37	8
288E-2105-WB01	Aqueous	NO UNKNOWNS OR TICS	0	0

288E:PAA005D5.W51

APPENDIX D

Summary of Results from Samples Analyzed at Tufts University

AKH000967

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 2

ENVIRON SAMPLE ID	288E-0202-SB01	288E-0202-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	19.10	
Acenapthylene	3.30	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	
Chrysene & Benzo[a]anthracene	ND	
Fluoranthene & Pyrene	2.20	
Fluorene	1.30	
Naphthalene	7.50	
Phenanthrene & Anthracene	10.40	
Volatile Organic Compounds (ppb)		
Ethylbenzene		780.20
Toluene		ND
m & p Xylene		525.40
Benzene		ND

AKH000968

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 5

ENVIRON SAMPLE ID	288E-0502-SB01	288E-0502-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	
Acenapthylene	ND	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	
Chrysene & Benzo[a]anthracene	ND	
Fluoranthene & Pyrene	5.60	
Fluorene	ND	
Naphthalene	1.00	
Phenanthrene & Anthracene	2.70	
Volatile Organic Compounds		
Ethylbenzene		ND
Toluene		2526.70
m & p Xylene		ND
Benzene		ND

AKH000969

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 9

ENVIRON SAMPLE ID	288E-0902-SB01	288E-0903-SB01	288E-0903-SB02	288E-0904-SB01	288E-0904-SB02	288E-0905-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	1.0-1.2	0.0-0.5	0.5-0.8	0.0-0.5	1.5-1.7	1.3-1.5
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene		ND		ND		
Acenapthylene		ND		ND		
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene		ND		111.30		
Chrysene & Benzo[a]anthracene		ND		29.30		
Fluoranthene & Pyrene		ND		18.50		
Fluorene		ND		ND		
Naphthalene		ND		ND		
Phenanthrene & Anthracene		ND		19.20		
Volatile Organic Compounds						
Ethylbenzene	34.90		38.00		20.80	13.20
Toluene	ND		ND		348.30	ND
m & p Xylene	85.20		123.00		36.80	245.70
Benzene			ND		ND	ND

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 10

ENVIRON SAMPLE ID	288E-1003-SB01
MATRIX	Soil
COLLECTION METHOD	HSAB
DEPTH (feet)	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)	
Acenapthene	0.30
Acenapthylene	0.80
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND
Chrysene & Benzo[a]anthracene	2.30
Fluoranthene & Pyrene	25.30
Fluorene	2.60
Naphthalene	0.70
Phenanthrene & Anthracene	30.90
Volatile Organic Compounds	
Ethylbenzene	
Toluene	
m & p Xylene	
Benzene	

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 13

ENVIRON SAMPLE ID	288E-1305-SB01	288E-1306-SB01
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	ND
Acenapthylene	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND
Chrysene & Benzo[a]anthracene	ND	ND
Fluoranthene & Pyrene	16.20	0.10
Fluorene	ND	ND
Naphthalene	ND	ND
Phenanthrene & Anthracene	18.70	0.30
Volatile Organic Compounds		
Ethylbenzene		
Toluene		
m & p Xylene		
Benzene		

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 15

ENVIRON SAMPLE ID	288E-1506-SB01	288E-1506-SB03	288E-1507-SB01	288E-1507-SB03
MATRIX	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.0-1.5	0.0-0.5	2.0-4.0
Polycyclic Aromatic Hydrocarbons (ppm)				
Acenapthene	4.40	ND	ND	ND
Acenapthylene	4.20	ND	ND	2.40
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	424.80	ND	84.70	ND
Chrysene & Benzo[a]anthracene	595.80	ND	13.80	5.30
Fluoranthene & Pyrene	1108.10	ND	7.40	ND
Fluorene	563.30	ND	ND	ND
Naphthalene	18.60	ND	ND	ND
Phenanthrene & Anthracene	4816.20	ND	ND	ND
Volatile Organic Compounds				
Ethylbenzene				
Toluene				
m & p Xylene				
Benzene				

AKH000973

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 17

ENVIRON SAMPLE ID	288E-1706-SB01	288E-1706-SB03	288E-1707-SB01	288E-1707-SB03	288E-1707-SB03A	288E-1708-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	0.0-0.5	0.5-1.0	0.5-1.0	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND	ND	ND	ND	ND	ND
Acenapthylene	ND	0.40	ND	0.30	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	88.40	ND	ND	ND
Chrysene & Benzo[a]anthracene	ND	ND	76.80	ND	ND	ND
Fluoranthene & Pyrene	ND	0.70	56.80	0.10	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.70	1.20	0.10	ND	ND
Phenanthrene & Anthracene	ND	0.70	31.00	0.20	ND	ND
Volatile Organic Compounds						
Ethylbenzene						
Toluene						
m & p Xylene						
Benzene						

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

AKH000974

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 17

ENVIRON SAMPLE ID	288E-1708-SB01	288E-1708-SB03	288E-1709-SB01	288E-1709-SB01	288E-1709-SB03
MATRIX	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	2.5-3.0
Polycyclic Aromatic Hydrocarbons (ppm)					
Acenapthene	ND	ND	0.50	ND	ND
Acenapthylene	ND	ND	0.50	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	80.10	ND	ND
Chrysene & Benzo[a]anthracene	ND	ND	43.00	ND	6.00
Fluoranthene & Pyrene	ND	ND	27.80	ND	5.60
Fluorene	ND	ND	1.40	ND	ND
Naphthalene	ND	ND	3.30	ND	ND
Phenanthrene & Anthracene	ND	0.50	53.00	0.80	3.00
Volatile Organic Compounds					
Ethylbenzene					
Toluene					
m & p Xylene					
Benzene					

AKH000975

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 18

ENVIRON SAMPLE ID	288E-1802-SB01	288E-1802-SB03
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	ND
Acenapthylene	0.20	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	13.40	53.00
Chrysene & Benzo[a]anthracene	2.40	10.80
Fluoranthene & Pyrene	1.70	8.80
Fluorene	ND	ND
Naphthalene	ND	ND
Phenanthrene & Anthracene	1.20	8.40
Volatile Organic Compounds		
Ethylbenzene		
Toluene		
m & p Xylene		
Benzene		

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 26

ENVIRON SAMPLE ID	288E-2601-SB01	288E-2601-SB02	288E-2602-SB01	288E-2602-SB02	288E-2603-SB01	288E-2603-SB02
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2	0.2-0.5	1.7-2.0	0.0-0.5	1.5-2.0
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND		0.30		ND	
Acenapthylene	ND		1.80		ND	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND		ND		ND	
Chrysene & Benzo[a]anthracene	ND		5.00		ND	
Fluoranthene & Pyrene	ND		9.30		ND	
Fluorene	ND		3.60		ND	
Naphthalene	ND		11.80		ND	
Phenanthrene & Anthracene	ND		33.30		ND	
Volatile Organic Compounds						
Ethylbenzene		10.50		513.70		ND
Toluene		116.90		ND		ND
m & p Xylene		48.90		1698.60		82.00
Benzene		ND		ND		ND

AKH000977

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 26

ENVIRON SAMPLE ID	288E-2604-SB01	288E-2604-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	
Acenapthylene	ND	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	
Chrysene & Benzo[a]anthracene	ND	
Fluoranthene & Pyrene	1.10	
Fluorene	ND	
Naphthalene	ND	
Phenanthrene & Anthracene	ND	
Volatile Organic Compounds		
Ethylbenzene		10.90
Toluene		ND
m & p Xylene		104.40
Benzene		ND

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 28

ENVIRON SAMPLE ID	288E-2802-SB01
MATRIX	Soil
COLLECTION METHOD	HAB
DEPTH (feet)	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)	
Acenapthene	2.20
Acenapthylene	0.30
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	42.50
Chrysene & Benzo[a]anthracene	12.60
Fluoranthene & Pyrene	10.90
Fluorene	ND
Naphthalene	ND
Phenanthrene & Anthracene	5.30
Volatile Organic Compounds	
Ethylbenzene	
Toluene	
m & p Xylene	
Benzene	

AKH000979

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

ENVIRON SAMPLE ID	288E-B-1-SB01	288E-B-1-SB02	288E-B-1-SB03	288E-B-2-SB01	288E-B-2-SB02	288E-B-2-SB03
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	1.5-2.0	0.0-0.5	2.0-3.0	3.0-3.5
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND		ND	ND	ND	ND
Acenapthylene	0.50		4.70	ND	ND	0.20
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND		673.20	ND	ND	ND
Chrysene & Benzo[a]anthracene	5.00		264.40	0.80	ND	ND
Fluoranthene & Pyrene	2.80		155.50	2.00	4.30	ND
Fluorene	ND		6.90	ND	ND	ND
Naphthalene	ND		ND	ND	ND	ND
Phenanthrene & Anthracene	2.10		74.30	1.50	8.20	0.20
Volatile Organic Compounds						
Ethylbenzene		71.80				
Toluene		1262.00				
m & p Xylene		206.20				
Benzene		ND				

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

ENVIRON SAMPLE ID	288E-B-3-SB01	288E-B-3-SB03	288E-B-4-SB01	288E-B-5-SB01	288E-B-5-SB03	288E-B-6-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HAB	HAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	1.0-1.5	0.0-2.0
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND	0.50	ND	ND	ND	ND
Acenapthylene	ND	1.20	ND	ND	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	10.70	ND	26.80	ND
Chrysene & Benzo[a]anthracene	ND	7.40	4.70	ND	11.90	ND
Fluoranthene & Pyrene	ND	4.30	5.80	0.30	7.80	ND
Fluorene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
Phenanthrene & Anthracene	0.50	8.80	8.40	ND	5.90	ND
Volatile Organic Compounds						
Ethylbenzene						
Toluene						
m & p Xylene						
Benzene						

Note: ND = Not detected

288E:PAA00592.W51

AKH000980

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case No. 85403

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

ENVIRON SAMPLE ID	288E-B-3-SB01	288E-B-3-SB03	288E-B-4-SB01	288E-B-5-SB01	288E-B-5-SB03	288E-B-6-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HAB	HAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	1.0-1.5	0.0-2.0
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND	0.50	ND	ND	ND	ND
Acenapthylene	ND	1.20	ND	ND	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	10.70	ND	26.80	ND
Chrysene & Benzo[a]anthracene	ND	7.40	4.70	ND	11.90	ND
Fluoranthene & Pyrene	ND	4.30	5.80	0.30	7.80	ND
Fluorene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
Phenanthrene & Anthracene	0.50	8.80	8.40	ND	5.90	ND
Volatile Organic Compounds						
Ethylbenzene						
Toluene						
m & p Xylene						
Benzene						

Note: ND = Not detected

288E:PAA00592.W51

17

Select for FOCUS™ or Delivery

Hoover's Company Records - Basic Record, 04/11/2006, Textron Inc.

Hoover's Company Records - Basic Record

April 11, 2006

Textron Inc.

40 Westminster St.
Providence, RI 02903-2596
United States

* * * * * * * * * * **COMMUNICATIONS** * * * * * * * * * *
TELEPHONE: 401-421-2800
FAX: 401-421-2878
URL: http://www.**textron**.com

* * * * * * * * * * **COMPANY IDENTIFIERS** * * * * * * * * * *
TICKER: TXT
HOOVER ID: 11466

* * * * * * * * * * **COMPANY INFORMATION** * * * * * * * * * *
LEGAL STATUS: Public
EMPLOYEES: 37,000 (As of 2005)
RANKINGS:
FORTUNE 500: 190

* * * * * * * * * * **CORPORATE STRUCTURE** * * * * * * * * * *
SUBSIDIARIES:
- Bell Helicopter **Textron, Inc.**
- Cessna Aircraft Company
- CitationShares Holdings, LLC
- E-Z-GO **Textron**
- Greenlee **Textron** Inc
- **Textron** Financial Corporation

* * * * * * * * * * **EXECUTIVES** * * * * * * * * * *
OFFICERS:
Lewis B. Campbell, Chairman, President, and CEO
Theodore R. (Ted) French, EVP and CFO
Mary L. Howell, EVP, Government, Strategy Development, and International, Communications and Investor Relations

* * * * * * * * * * **DESCRIPTION** * * * * * * * * * *
Executives should like **Textron:** The company's golf carts enrich their golfing jaunts; its Cessna airplanes and Bell helicopters whisk them around; its auto parts keep their cars running; and its financial subsidiary provides loans. **Textron** has five operating segments: Industrial, which makes golf carts, turf equipment, tools, pumps and hydraulic systems, fuel systems, and transmissions; Bell, which includes Bell Helicopter (helicopters) and **Textron** Systems (smart weapons, surveillance systems, actuators); Cessna, which makes business jets and single-engine turboprops and piston planes; Fastening Systems, which makes aerospace and automotive fasteners and tools; and Finance, which provides commercial loans.RETURN

HOOVER INDUSTRIES:
- Aerospace & Defense
  - AIRCRAFT MANUFACTURING

- Commercial Aircraft Manufacturing
- Military Aircraft Manufacturing
- Automotive & Transport
  - Auto Parts Manufacturing

* * * * * * * * * * **MARKET AND INDUSTRY** * * * * * * * * * *

COMPETITORS:
GE
Lear
United Technologies

* * * * * * * * * * **FINANCIALS** * * * * * * * * * *

FISCAL YEAR DATE: December 2005

* * * * * * * * * * **INCOME STATEMENT** * * * * * * * * * *

SALES: $10,043,000,000
NET INCOME: $203,000,000

* * * * * * * * * * **SECURITIES INFORMATION** * * * * * * * * * *

EXCHANGE: NYSE

LOAD-DATE: April 11, 2006

About Textron

- Our Company
  - Company History
  - Vision & Strategy
  - International Presence
  - FAQs
  - Contact Us
- Our Commitment
- Our Leadership
- Corporate Governance

Textron.com Home > About Textron > Our Company

Our Company

Textron Inc. (NYSE: TXT) is one of the world's largest and most successful multi-industry companies. Founded in 1923, we have grown into a network of businesses with total revenues of $10 billion, and more than 37,000 employees in nearly 33 countries, serving a diverse and global customer base. Headquartered in Providence, Rhode Island, Textron is ranked 190th on the FORTUNE 500 list of largest U.S. companies. Organizationally, Textron consists of numerous subsidiaries and operating divisions, which are responsible for the day-to-day operation of their businesses ("Textron businesses")[1].

While we take great pride in our long history, we are even more excited by the future. Our vision is to be the premier multi-industry company, recognized for our powerful brands, world-class enterprise processes and talented people. By placing customers first in everything we do, Textron continues to grow as an industry leader with strong brands such as Bell Helicopter, Cessna Aircraft, Kautex, Lycoming, E-Z-GO and Greenlee, among others.

Vision and Strategy

All Textron businesses share a single vision and are working together to execute a corporate strategy, focused on creating superior shareholder value by leveraging the strengths of the enterprise.

Read More >>

Company History

Textron Inc. started as a small textile company in 1923, when 22-year-old Royal Little founded the Special Yarns Corporation in Boston, Massachusetts.

Read More >>

International Presence

With more than 37,000 employees in nearly 33 countries, Textron is well positioned to provide

Frequently Asked Questions

Do you have a question about Textron's businesses, its history or job opportunities? Enter here to view the most frequently asked questions about the company.

2005 Annual I

Rea
Tex
20
An
Re

Current News

> Get the latest about Textron's network of comp

News by E-M

> Subscribe to Textron's e-mai service to recei news and financi releases.

FMT001351

945990786

integrated solutions and services to customers around the world.

Read More >>

Read More >>

(1) The terms "Textron businesses" and "our family of businesses" refer to Textron Inc., its subsidiaries and other operating units.